



European Aviation Safety Agency — Rulemaking Directorate  
**Comment-Response Document 2013-26**

**Amendment of requirements for flight recorders  
and underwater locating devices**

CRD TO NPA 2013-26 — RMT.0400 (OPS.090(a)) & RMT.0401 (OPS.090(b)) — 5.5.2014  
Related Opinion No 01/2014

**EXECUTIVE SUMMARY**

This Comment-Response Document (CRD) contains the comments received on NPA 2013-26 (published on 20 December 2013) and the responses provided thereto by the Agency.

In total, 75 comments were received by the end of the consultation period (20 March 2014) from interested parties including industry, national aviation authorities, operators and associations.

The four issues which were addressed in NPA 2013-26 were the following:

- unreliability of obsolete recording technologies such as magnetic tape, magnetic wire and frequency modulation;
- frequent cases of the cockpit voice recorder (CVR) overwriting the recordings after an accident or a serious incident;
- insufficient transmission time of underwater locating devices (ULDs) fitted to flight recorders; and
- wreckage localisation in oceanic areas.

The most commented issues were the CVR overrun issue and the issue related to very long detection range underwater locating device for wreckage localisation in oceanic areas.

Based on the comments and responses, Opinion No 01/2014 was developed and is published together with this CRD.

For information, the Agency publishes the draft Implementing Rules and AMC/GM in this CRD.

<b>Applicability</b>		<b>Process map</b>	
Affected regulations and decisions:	Annexes IV, VI and VIII to Commission Regulation (EU) No 965/2012 Decision 2012/017/R, Decision 2012/018/R, Decision 2013/021/R, Decision 2014/018/R (AMC/GM to Part SPO)	Concept Paper:	No
Affected stakeholders:	Aircraft operators, flight crew members, aircraft pilots	Terms of Reference:	24.9.2012
Driver/origin:	Safety, Legal obligation (ICAO Standards)	Rulemaking group:	No
Reference:	ICAO Annex 6 Part I, Part II, and Part III Safety recommendations CAND-1999-002 (McDonnell Douglas MD11, HB-IWF, 02/09/1998); GREC-2006-045 (B737 of Helios, 5B-DBY, 14/08/2005); NORW-2006-013 (ATR 42, OY-JRJ 31/01/2005); NETH-2011-015 (Boeing 737, PH-BDP, 10/02/2010); UNKG-2012-013 (Boeing 767, G OOBK, 03/10/2010); FRAN-2012-025 (Airbus 340, F-GLZU, 22/07/2011); FINL-2012-003 (Airbus A330, OH-LTO, 11/12/2010); FRAN-2009-016, FRAN-2009-017, FRAN-2009-018, FRAN-2011-017 and FRAN-2011-018 (Airbus A330, F-GZCP, 01/06/2009); UNKG-2008-020 (ATR42, EI-SLD, 18/01/2007).	RIA type:	Full & light
		Technical consultation during NPA drafting:	No
		Publication date of the NPA:	20.12.2013
		Duration of NPA consultation:	3 months
		Review group:	No
		Focussed consultation:	No
		Publication date of the Opinion:	In parallel with this CRD
		Publication date of the Decision:	2015/Q2

---

## Table of contents

1.	Procedural information .....	3
1.1.	The rule development procedure .....	3
1.2.	The structure of this CRD and related documents .....	3
1.3.	The next steps in the procedure .....	3
2.	Summary of comments and responses .....	4
2.1.	General comments.....	4
2.2.	Comments related to the discontinuation of obsolete recording technologies .....	5
2.3.	Comments related to the CVR overruns after an accident or a serious incident .....	6
2.4.	Comments related to the increase of the transmission time of flight recorders underwater locating devices (ULDs) to 90 days .....	9
2.5.	Comments related to the ULD with a very long detection range for wreckage localisation in an oceanic area .....	9
3.	Draft amendment to Regulation (EU) No 965/2012 .....	12
3.1.	Draft amendment to Annex IV (Part-CAT).....	12
3.2.	Draft amendment to Annex VI (Part-NCC) .....	15
3.3.	Draft amendment to Annex VII (Part-SPO) .....	17
4.	Draft amendment to AMC/GM to Regulation (EU) No 965/2012.....	20
4.1.	Draft amendment to AMC/GM to Annex III (Part-ORO) .....	20
4.2.	Draft amendment to AMC/GM to Annex IV (Part-CAT) .....	22
4.3.	Draft amendment to AMC/GM to Annex III (Part-NCC) .....	29
4.4.	Draft amendment to AMC/GM to Annex III (Part-SPO) .....	33
5.	Individual comments and responses .....	37
6.	Attachments to comments .....	89
	Annex: Recommendations of the EFRPG on very long recording duration CVRs.....	90

## 1. Procedural information

### 1.1. The rule development procedure

The European Aviation Safety Agency (hereinafter referred to as the 'Agency') developed this Comment-Response Document (CRD) in line with Regulation (EC) No 216/2008<sup>1</sup> (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure<sup>2</sup>.

This rulemaking activity is included in the Agency's [4-year Rulemaking Programme](#), under RMT.0400 & RMT.0401 (OPS.090(a) & OPS.090(a)). The scope and timescale of the task were defined in the related Terms of Reference (see process map on the title page).

The draft Regulation and AMC/GM have been developed by the Agency. All interested parties were consulted through NPA 2013-26<sup>3</sup>, which was published on 20 December 2013. 75 comments were received from interested parties, including industry, national aviation authorities, operators and staff associations.

The text of this CRD has been developed by the Agency.

The process map on the title page contains the major milestones of this rulemaking activity.

### 1.2. The structure of this CRD and related documents

This CRD provides a summary of comments and responses as well as the full set of individual comments (and responses thereto) received to NPA 2013-26. The resulting draft Implementing Rules and AMC/GM text is provided in Chapter 3 of this CRD.

### 1.3. The next steps in the procedure

The Opinion containing the proposed changes to EU regulations, is addressed to the European Commission, and is published together with this CRD.

The Decision containing containing Acceptable Means of Compliance (AMC) and Guidance Material (GM) will be published by the Agency when the related Regulation is adopted by the European Commission.

---

<sup>1</sup> Regulation (EC) No 216/2008 of the European Parliament and the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1), as last amended by Commission Regulation (EU) No 6/2013 of 8 January 2013 (OJ L 4, 9.1.2013, p. 34).

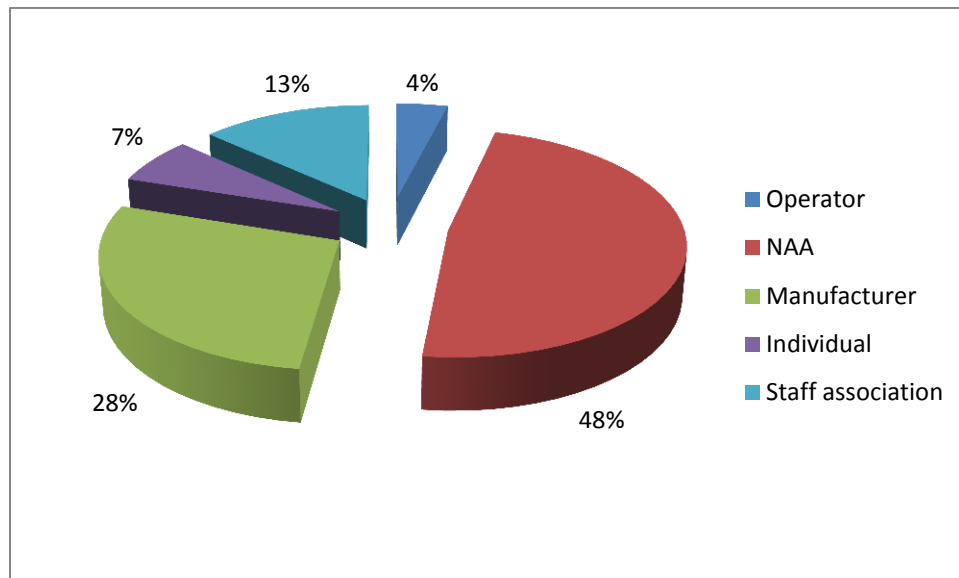
<sup>2</sup> The Agency is bound to follow a structured rulemaking process as required by Article 52(1) of the Basic Regulation. Such process has been adopted by the Agency's Management Board and is referred to as the 'Rulemaking Procedure'. See Management Board Decision concerning the procedure to be applied by the Agency for the issuing of Opinions, Certification Specifications and Guidance Material (Rulemaking Procedure), EASA MB Decision No 01-2012 of 13 March 2012.

<sup>3</sup> <http://easa.europa.eu/document-library/notices-of-proposed-amendments/npa-2013-26>

## 2. Summary of comments and responses

A total of 75 comments from 23 national aviation authorities, associations representing staff, operators, manufacturers and individuals were received during the 3-month public consultation period of NPA 2013-26.

Below is a representation of the number of comments according to stakeholder category.



Regarding the 4 RIAs associated with the issues to be addressed, the most commented RIAs were the RIA B related to CVR overrun after an accident or a serious incident and the RIA D related to Very long detection range underwater locating device for wreckage localisation in oceanic areas.

### 2.1. General comments

- Three commentators (LBA Germany, DGAC France and CAA Sweden) expressed their general support for the proposals of NPA 2013-26.
- Several commentators (Bombardier, GAMA, Airbus, Boeing) asked why some of the requirements proposed by NPA 2013-26 go beyond the provisions of ICAO Annexes and/or FAA rules. They were arguing that the non-harmonised approach between regulators was generating unjustified costs for them and for their customers. In fact, only one provision proposed by NPA 2013-26 is not already prescribed by ICAO Annex 6: it is the requirement to equip aeroplanes with an MCTOM of over 27 000 kg and first issued with an individual CofA on or after 1 January 2019 with a CVR that has a minimum recording duration of 15 hours.

It should be noted that according to Article 2 of Regulation (EC) No 216/2008, the principal objective of the Agency is 'to establish and maintain a high uniform level of civil aviation safety in Europe', while harmonisation with ICAO Standards and Recommended Practices is only an additional objective. Please refer to Opinion No 01-2014 for the summary of the impact assessment of the selected options.

Finally, it should be noted that for all the equipment that is proposed to be mandated by NPA 2013-26, international industry standards are already published.

- (c) One commentator (CAA Denmark) urged the Agency to carefully consider the impact on proportionality and the economic impact of the proposals made by NPA 2013-26. In fact, these impacts were already carefully assessed in the sections titled 'analysis of impact' of every regulatory impact assessments (RIA). It is worth noting that no comment has demonstrated that any of the assumptions made for the economic impact or for the impact on proportionality of any RIA was not correct.

## 2.2. Comments related to the discontinuation of obsolete recording technologies

- (a) One commentator (BEA France) expressed support for the proposals made by NPA 2013-26 with regards to obsolete recording technologies.
- (b) One commentator (FAA) expressed support for the retrofit of all commercial air transport aeroplanes with 2-hours recording duration, solid-state CVRs and for the retrofit of all commercial air transport helicopters with solid-state CVRs, indicating that this had already been added into FAA rules in 2005.
- (c) One commentator (Association of Dutch Aviation Technician) suggested that the Safety Information Bulletin 2009-7 is completed with recommendations to maintenance personnel related on the precautions to take when the circuit breaker of the CVR is stripped. However, defining the appropriate procedures for preserving the CVR recording is the responsibility of the aircraft operator. For this reason, NPA 2013-26 is proposing that provisions related to CVR preservation are specified in the air operation manual, including 'Instructions and means for the flight crew to deactivate the flight recorders immediately after completion of the flight and inform relevant personnel that the flight recorder recordings shall be preserved' (refer to AMC3 ORO.MLR.100). Since the aircraft operator has to inform the maintenance personnel of the precautions to be taken when the circuit breaker of a CVR is stripped, it is considered that there is no need to amend SIB 2009-7.
- (d) Two commentators (Honeywell, CAA UK) recommended to maintain a maximum time interval of 1 year between two recording inspections of a solid-state flight recorder. A time interval of 1 year is appropriate for a magnetic-tape flight recorder, but not needed if the flight recorder firstly is very reliable and secondly provides a timely feedback if the flight recorder fails. This is why a time interval of 2 years is permitted in the proposed amendment of NPA 2013-26 only if:
- (1) the flight recorder is solid-state (reliable recording technology), and
  - (2) the flight recorder system is fitted with continuous monitoring for proper operation, and the aural or visual means for pre-flight checking the flight recorders for proper operation are used every day, or if they are not available, an operational check is performed at time intervals not exceeding seven days (timely feedback if the flight recorder fails).
- (e) One commentator (CAA UK) recommended that means for pre-flight checking the flight recorders for proper operation be required to be used before the first flight of the day, instead of every day. This was not accepted, because the intent is that the proper operation of the flight recorder is checked at intervals of a few days in all cases (every day if the means for pre-flight checking are available, and at time intervals of 7 days maximum if they are not). The time of the day at which this check is taking place does not matter.

- (f) One commentator (Dassault Aviation) recommended to introduce the notions of continuous built-in test and initiated built-in test in subparagraph (c) of AMC1 CAT.GEN.MPA.195(b). However, this is not needed since GM3 CAT.GEN.MPA.195(b) already provides a definition of an 'aural or visual means for pre-flight checking a flight recorder for proper operation'.
- (g) One commentator (CAA UK) recommended that the condition in (a)(4)(iii) of subparagraph (a)(4) of AMC1 CAT.GEN.MPA.195(b) be changed to make it clear that an inspection of flight parameters similar to the inspection of the FDR recording was implied by this condition, and to extend the time interval between two inspections to 2 years, in order to be consistent with subparagraph (a)(2). This has been accepted and corrections have been made to AMC1 CAT.GEN.MPA.195(b), AMC1 NCC.GEN.145(b) and AMC1 SPO.GEN.145(b).

### 2.3. Comments related to the CVR overruns after an accident or a serious incident

- (a) One commentator (BEA France) expressed support for the proposals made by NPA 2013-26 with regard to CVR overruns.
- (b) One commentator (UK CAA) expressed support for the proposed amendments to ensure that the CVR recordings preservation measures are defined in case of an accident or serious incident.
- (c) One commentator (DGAC France) suggested that provisions similar to what is proposed for AMC2 ORO.MLR.100 (Operations Manual, NCC operations) and AMC3 ORO.MLR.100 (Operations Manual, CAT operations) are added to AMC4 ORO.MLR.100 (Operations Manual, SPO operations). This comment has been taken into account in the draft amendment to AMCs and GM to Part-ORO.
- (d) One commentator (ECA) proposed to reinstate the former provision of paragraph OPS 1.085 of EU OPS, that allowed the commander to deactivate the CVR in flight in order to preserve the recording of a serious incident. This provision had been removed prior to NPA 2013-26, based on a recommendation of the Flight Recorder Study Group (FRSG) of the Joint Aviation Authorities, before the rulemaking competence for air operation rules was transferred to the Agency. The FRSG considered that, in case of a serious incident, it was preferable to keep the CVR activated and lose the relevant part of the recording, rather than running the risk that the serious incident develops into an accident and audio essential for understanding this accident is missing because the CVR was deactivated. For this reason the ECA proposal has not been accepted.
- (e) Two commentators (Honeywell, Swiss International Airlines) suggested the introduction of a quick access CVR. Another commentator (CAA Netherlands) suggested to require a recording duration for the CVR that would be sufficient to retain the recording between two stops at the aircraft operator base, because at outposts there is usually no equipment to read out the CVR. These proposals are contradictory with the essential principle that the CVR is primarily a tool for official safety investigation purposes, and as a consequence:
  - (1) according to air operation rules, using the CVR recordings for other purposes than investigation by an authority or CVR serviceability requires each time the consent of the crew members concerned;

- (2) industry standards prescribe that the CVR design should not facilitate quick download of its recording;
  - (3) a non-crash-protected CVR is not appropriate when considering the crash conditions encountered in large aeroplane accidents; and
  - (4) according to ICAO Annex 13 Standards, the State conducting the investigation (usually the State of Occurrence) decides if the CVR recordings should be preserved. Whatever the recording duration of the CVR, the aircraft operator is not entitled to fly away with this equipment without prior authorisation by the State conducting the safety investigation.
- (f) Several commentators (Honeywell, FAA, GAMA, Embraer, Airbus) questioned the choice of 15 hours for the duration of CVR recordings. Their argument was that such recording duration is not needed for recording a short-range flight, and on the other hand it is not enough for recording entirely the longest of long-range flights. These commenters suggested to adapt the recording duration of the CVR to the endurance of the aircraft on which it is installed.

In fact, a CVR recording duration which is dependent on the aircraft endurance would lead to introduce more CVR variants and deprive aircraft operators of the flexibility to use the same equipment for different aircraft types. It would also add unnecessary complexity to flight recorder requirements. Current FDR and CVR recording duration requirements are not tailored to the endurance of the aircraft. Therefore, a unique recording duration value is preferred.

A recording duration in the range from 15 to 20 hours was recommended by the European Flight Recorder Partnership Group (EFRPG)<sup>4</sup> in February 2013 because it would fulfill the three following purposes:

- (1) Adapt the recording duration of the CVR to the needs of investigating serious incidents. With the entry into force of Regulation (EU) No 996/2010 in 2010, the investigation of serious incidents has become an obligation for safety investigation authorities of all EU Member States. However, after a serious incident the flight can usually be conducted until its planned destination so that quite often the recording of the serious incident is overwritten even before the flight is completed;
- (2) Take into account these historical accidents where a recording duration of 2 hours was found to be not sufficient; and
- (3) Make the CVR more immune to inappropriate actions by the flight crew or maintenance personnel after the flight. If, for a given aircraft, the recording

---

<sup>4</sup> The European Flight Recorder Partnership Group (EFRPG) is a voluntary group of European flight recorder experts which addresses issues related to the design, installation, operation, serviceability and use of regulatory flight recorders. This group investigates these issues and produce conclusions and propositions. According to their terms of reference:

'the EFRPG activities aim at enhancing aviation safety in Europe while taking into account other considerations (such as privacy, economic impact, feasibility, etc.). The group issues propositions that they think are reasonable.'

The EFRPG brings together experts from National Aviation Authorities, Safety Investigation Authorities, aircraft operators, aircraft manufacturers, pilot associations and the Agency.

The EFRPG produces documents and statements under its own name solely and never on behalf of any Authority. EFRPG documents always contain the following disclaimer:

*"This document was produced by the European Flight Recorder Partnership Group (EFRPG) which is an independent voluntary group of European flight recorder experts. It is solely presenting the EFRPG views and it is not binding for any other organization."*

duration exceeds by several hours the usual duration of a flight, the recording of the last flight could be partially overwritten only if the CVR was kept running for several hours after completion of the flight.

The EFRPG surveyed equipment manufacturers and established that a 15-hours recording duration CVR compliant with the specifications of EUROCAE Document 113 was achievable with 2013 technology, and, based on this result, NPA 2013-26 proposed the introduction of a 15-hours recording duration CVR. However, it is true that a somewhat longer recording duration would make the CVR able to capture entirely even very long-range flights, and thus offer a more complete solution on the long term. Therefore, a recording duration of 20 hours has been finally retained. In order for the industry to get sufficient time to prepare for this new recording duration, it has been decided to require this new type of CVR for large aeroplanes manufactured after 1 January 2020 (instead of 1 January 2019).

- (g) One commentator (ECA) raised several comments against the introduction of 15-hours recording duration CVRs on board large aeroplanes. They claimed that the negative impacts of such a very-long recording duration CVR were underrated in the regulatory impact assessment (RIA) B of NPA 2013-26, in particular the risk of misuse, and that the potential benefits were 'rated inconsistently' by this RIA. They also criticised RIA B for having been developed in isolation and not having taken into account the conclusions of an evaluation made by the EFRPG.

The comments of ECA were not accepted, since:

- (1) the analysis of impacts is detailed over 14 pages in RIA B, and it is the result of a collegial work involving several experts of the Agency, including impact assessment experts; and
- (2) the basis for RIA B is the document titled 'Very long recording duration Cockpit Voice Recorder' produced by the EFRPG. Most of the conclusions of RIA B are the same as the conclusions of the EFRPG document.

ECA comments did not interpret correctly Section 5 (analysis of impacts) of RIA B, and they omitted several detailed explanations provided in this section. It is also noteworthy that no other commentator questioned the quality of Section 5.

The EFRPG document 'Very long recording duration Cockpit Voice Recorder' is not public, however, its recommendations have been appended to this CRD for information. The EFRPG document recommends to require that newly manufactured aeroplanes with an MCTOM of over 27 000 kg are equipped with a CVR of a recording duration of no less than 15 hours and no more than 20 hours. This document makes other recommendations (related to advance arrangements between safety investigation authorities and judicial authorities, and to penalties for disclosing illegally CVR recordings), however, the EFRPG document does not state that those are pre-requisites to the introduction of very long-recording duration CVRs.

Although there is no case known to the Agency of CVR recording misuse by aircraft operators, provisions have been added in paragraphs CAT.GEN.MPA.195, NCC.GEN.145 and SPO.GEN.145 to provide for a reinforced control of the use of CVR recordings during normal operation. In particular, if a CVR recording is used for purposes other than investigation (by a safety investigation authority, the competent authority or the administration of justice) and other than for ensuring



the CVR serviceability, then a procedure relating to the handling of the CVR recordings and transcripts shall be in place in addition to getting the prior consent by crew members and maintenance personnel concerned. A new AMC has also been inserted which identifies important elements of this procedure for handling CVR recordings, recommends that all information with a privacy content is removed from the recording at an early stage, and that the aircraft operator retains sufficient information on the use made of the CVR recording and evidence that this use got the prior consent of the persons concerned. A new GM has been inserted to explain why particular precautions must be taken when handling CVR recordings.

- (h) Several commentators (GAMA, Embraer) raised the concern that the new CVR requirements may also impact those aircraft which were voluntarily equipped with CVR, forcing aircraft operators to costly retrofit and dissuading future voluntary equipage decisions. This is not the intent of the Agency, and the wording of the new requirements has been clarified to exclude voluntarily equipped aircraft.

#### **2.4. Comments related to the increase of the transmission time of flight recorders underwater locating devices (ULDs) to 90 days**

- (a) One commentator (BEA France) expressed support for the proposals made by NPA 2013-26 with regard to flight recorder ULDs with a transmission time of 90 days.
- (b) One commentator (Thomson Airways) raised that 90-days ULDs compliant with ETSO-C121b are not yet available. In fact, models of 90-days ULDs compliant with ETSO-C121a are already commercially available, and models compliant with ETSO-C121b are expected to be available by the end of 2014.
- (c) One commentator (FAA) indicated that the TSO-C121 and TSO-C121a are revoked on 1 March 2015. However, this measure will only result into flight recorder ULDs produced after this date being compliant with TSO C-121b. With this measure it will take roughly the service life of a ULD to get all 30-day ULDs replaced by 90-day ULDs on most flight recorders. ULDs have service life of 20 years or even longer. Hence this measure is not equivalent to a mandatory replacement of the ULDs currently installed on aircraft by 2020.
- (d) One commentator (Beechcraft Corporation) proposed that the replacement of flight recorders ULDs by 90-days ULDs be limited to aircraft with an MCTOM of over 5 700 kg and a MOPSC of more than 19 passengers. The justification for restricting the set of eligible aircraft being the cost and weight of 90-days ULDs. The commenter obviously confused 90-days ULDs and very long detection range ULDs. In fact, replacing a 30-days flight recorder ULD by an ULD with a transmission time of 90 days has no impact on the aircraft weight, as models of 90-days ULDs have the same weight and size factor and they are interchangeable with 30-days ULDs. The total cost of replacing the flight recorder ULDs for an aircraft equipped with two fixed flight recorders is assessed to be around EUR 800 according to RIA C of NPA 2013-26. Therefore, there is no reason for excluding some categories of aircraft from the requirement.

#### **2.5. Comments related to the ULD with a very long detection range for wreckage localisation in an oceanic area**

- (a) One commentator (BEA France) expressed support for the proposals made by NPA 2013-26 with regards to introducing ULD with a very long detection range.

- (b) Two commentators (Thomson Airways, Boeing) raised that models of long detection range ULDs compliant with ETSO-C200 are not yet available. However, such models are expected to be available in the first half of 2016, leaving enough time for a retrofit until 1 January 2019.
- (c) Two commentator (FAA, Qantas Airways Avionics Engineering) suggested that the automatic means to locate the end of flight within 6 NM take into account the security risks, and that it should not be easy to deactivate such a means in flight. Such a provision has been added, as the recent loss of the B777 registered 9M-MRO (Malaysia Airlines flight MH370) has highlighted that it was easy to deactivate the aircraft transponder and become invisible for ATM ground surveillance means. Military surveillance means are deemed to cover effectively the national airspace of States, however, large portions of oceans are not monitored, as highlighted by the accidents AF447 or MH370.
- (d) Two commentators (Airbus, Boeing) asked that the proposed requirement to mandate long detection range ULD be withdrawn (new subparagraph (f) proposed to be added to paragraph CAT.IDE.A.285). Their arguments were that:
  - (1) such an ULD would not address accidents over remote land areas;
  - (2) retrofit cost are too high compared to the safety benefits; and
  - (3) when considering the alternative requirement of an automatic means to locate, in case of an accident, the end of the flight within 6 NM accuracy, no technological solution is mature and there is not yet an ICAO Standard.

In spite of these comments, the proposed addition to paragraph CAT.IDE.A.285 has been maintained because:

- (1) the very-long detection range ULD is an effective help for locating the wreckage after an accident for investigation purposes. Most of oceanic areas are out of range of ATM surveillance means, so that in the event of an accident in such an area, its location may be unknown or very inaccurate, resulting in the search operations being very long and costly for the State conducting the investigation. In addition, even military surveillance means are not helpful for locating quickly accidents in oceanic areas. On the contrary, accidents of large aeroplanes over land have always been quickly located;
  - (2) the cost of retrofitting long detection range ULDs is moderate (in the range of 2 400 to 4 500 EUR per each individual aircraft: refer to RIA D of NPA 2013-26), and there is no significant implementation issue;
  - (3) this new requirement will actually bring EASA Member States in compliance with Standard 6.5.3.1(c) of ICAO Annex 6; and
  - (4) the automatic means to determine, in case of an accident, the end of the flight within 6 NM accuracy, is not required, but just offered as an alternative to the long detection range ULD. Hence the Agency is offering to the industry more room for inventing solutions addressing the investigation needs than provided in Standard 6.5.3.1(c) of ICAO Annex 6.
- (e) One commentator (DRS Technologies) made several comments to express their agreement with the conditions and the guidance proposed by NPA 2013-26 for the

automatic means to locate the end of the flight within 6 NM accuracy (new paragraphs AMC2 CAT.IDE.A.285(f) and GM1 CAT.IDE.A.285(f)).

### 3. Draft amendment to Regulation (EU) No 965/2012

#### 3.1. Draft amendment to Annex IV (Part-CAT)

##### CAT.GEN.MPA.105 Responsibilities of the commander

(a) The commander, in addition to complying with CAT.GEN.MPA.100, shall:

(...)

(10) ensure that flight recorders:

(i) flight recorders are not disabled or switched off during flight; and

(ii) in the event of an occurrence other than an accident or a serious incident that shall be reported according to ORO.GEN.160(a), flight recorders' recordings are not intentionally erased; and

~~(ii)~~(iii) in the event of an accident or a serious incident, or if preservation of recordings of flight recorders is directed by the investigating authority: ~~or an incident that is subject to mandatory reporting:~~

(A) flight recorders' recordings are not intentionally erased;

(B) flight recorders are deactivated immediately after the flight is completed; and

(C) precautionary measures to preserve the recordings of flight recorders are taken before leaving the flight crew compartment;

(...)

##### CAT.GEN.MPA.195 Preservation, production and use of flight recorder recordings

(a) Following an accident or a serious incident, or if directed by the investigating authority, the operator of an aircraft shall preserve the original recorded data for a period of 60 days or until otherwise directed by the investigating authority.

(b) (...)

(f) Without prejudice to Regulation (EU) No 996/2010:

(1) ~~CVR recordings shall only be used for purposes other than for the investigation of an accident or an incident subject to mandatory reporting, if all crew members and maintenance personnel concerned consent.~~ CVR recordings shall not be used for purposes other than the investigation by a safety investigating authority, by the competent authority or by the administration of justice, or for ensuring the CVR serviceability, unless:

(i) a procedure related to the handling of CVR recordings and of their transcript is in place; and

(ii) all crew members and maintenance personnel concerned have given their prior consent;

**SUBPART D – INSTRUMENTS, DATA, EQUIPMENT****SECTION 1 -Aeroplanes****CAT.IDE.A.185 Cockpit voice recorder**

- (a) The following aeroplanes shall be equipped with a cockpit voice recorder (CVR):
- (1) aeroplanes with an MCTOM of more than 5 700 kg; and
  - (2) multi-engined turbine-powered aeroplanes with an MCTOM of 5 700 kg or less, with an MOPSC of more than nine and first issued with an individual CofA on or after 1 January 1990.
- (b) Until 31 December 2018, the CVR shall be capable of retaining the data recorded during at least:
- (1) the preceding two hours in the case of aeroplanes referred to in (a)(1) when the individual CofA has been issued on or after 1 April 1998;
  - (2) the preceding 30 minutes for aeroplanes referred to in (a)(1) when the individual CofA has been issued before 1 April 1998; or
  - (3) the preceding 30 minutes, in the case of aeroplanes referred to in (a)(2).
- (c) On or after 1 January 2019, the CVR shall be capable of retaining the data recorded during at least:
- (1) the preceding 20 hours for aeroplanes with an MCTOM of more than 27 000 kg and first issued with an individual CofA on or after 1 January 2020; or
  - (2) the preceding 2 hours for aeroplanes with an MCTOM of up to 27 000 kg or that were first issued with an individual CofA before 1 January 2020.
- (d) On or after 1 January 2019, the CVR shall record on means other than magnetic tape or a magnetic wire.
- ~~(e)~~(e) The CVR shall record with reference to a timescale:
- (1) voice communications transmitted from or received in the flight crew compartment by radio;
  - (2) flight crew members' voice communications using the interphone system and the public address system, if installed;
  - (3) the aural environment of the flight crew compartment, including without interruption:
    - (i) for aeroplanes first issued with an individual CofA on or after 1 April 1998, the audio signals received from each boom and mask microphone in use;
    - (ii) for aeroplanes referred to in (a)(2) and first issued with an individual CofA before 1 April 1998, the audio signals received from each boom and mask microphone, where practicable;
- ~~(f)~~(f) The CVR shall start to record prior to the aeroplane moving under its own power and shall continue to record until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, in the case of aeroplanes issued with an individual CofA on or after 1 April 1998, the CVR shall start automatically to record prior to the aeroplane moving under its own power and continue to record until the termination of the flight when the aeroplane is no longer capable of moving under its own power.
- ~~(g)~~(g) In addition to ~~(f)~~, depending on the availability of electrical power, the CVR shall start to record as early as possible during the cockpit checks prior to engine start at the

beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight, in the case of:

- (1) aeroplanes referred to in (a)(1) and issued with an individual CofA after 1 April 1998; or
- (2) aeroplanes referred to in (a)(2).

~~(f)~~(h) If the CVR is not deployable, it ~~The CVR~~ shall have a device to assist in locating it in water. On or after 1 January 2018, this device shall have a minimum underwater transmission time of 90 days.

#### **CAT.IDE.A.190 Flight data recorder**

(...)

(e) If the FDR is not deployable, it ~~The FDR~~ shall have a device to assist in locating it in water. On or after 1 January 2018, this device shall have a minimum underwater transmission time of 90 days.

#### **CAT.IDE.A.195 Data link recording**

(...)

(d) If the recorder is not deployable, it ~~The recorder~~ shall have a device to assist in locating it in water. On or after 1 January 2018, this device shall have a minimum underwater transmission time of 90 days.

(...)

#### **CAT.IDE.A.285 Flight over water**

(...)

(f) On or after 1 January 2019, aeroplanes with an MCTOM of more than 27 000 kg shall be fitted with a securely attached underwater locating device that operates at a frequency of 8.8 kHz  $\pm$  1 kHz, unless:

- (1) the aeroplane is operated over routes on which it is at no point at a distance of more than 180 NM from the shore; or
- (2) the aeroplane is equipped with an automatic means to determine, following an accident where the aeroplane is severely damaged, the location of the point of impact with the Earth's surface within 6 NM accuracy.

### **Section 2 - Helicopters**

#### **CAT.IDE.H.185 Cockpit voice recorder**

(...)

(c) On or after 1 January 2019, the CVR shall record on means other than magnetic tape or a magnetic wire.

~~(d)~~(e) The CVR shall record with reference to a timescale: (...)

- (1) voice communications transmitted from or received in the flight crew compartment by radio;
- (2) flight crew members' voice communications using the interphone system and the public address system, if installed;
- (3) the aural environment of the flight crew compartment, including without interruption:

- (i) for helicopters first issued with an individual CofA on or after 1 August 1999, the audio signals received from each crew microphone;
- (ii) for helicopters first issued with an individual CofA before 1 August 1999, the audio signals received from each crew microphone, where practicable;
- (4) voice or audio signals identifying navigation or approach aids introduced into a headset or speaker.
- (e)(d) The CVR shall start to record prior to the helicopter moving under its own power and shall continue to record until the termination of the flight when the helicopter is no longer capable of moving under its own power.
- (f)(e) In addition to (e), for helicopters referred to in (a)(2) issued with an individual CofA on or after 1 August 1999:
  - (1) the CVR shall start automatically to record prior to the helicopter moving under its own power and continue to record until the termination of the flight when the helicopter is no longer capable of moving under its own power; and
  - (2) depending on the availability of electrical power, the CVR shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.
- (g)(f) If the CVR is not deployable, it ~~The CVR~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

#### **CAT.IDE.H.190 Flight data recorder**

(...)

- (e) If the FDR is not deployable, it ~~The FDR~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

#### **CAT.IDE.H.195 Data link recording**

(...)

- (d) If the recorder is not deployable, it ~~The recorder~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

(...)

### **3.2. Draft amendment to Annex VI (Part-NCC)**

#### **NCC.GEN.106 Pilot-in-command responsibilities and authority**

- (a) The pilot-in-command shall be responsible for:
  - (...)
  - (9) ensuring that flight recorders:
    - (i) are not disabled or switched off during flight; and

- (ii) in the event of an occurrence other than an accident or a serious incident that shall be reported according to ORO.GEN.160(a), flight recorders' recordings are not intentionally erased; and
- (iii) in the event of an accident, a serious incident or if preservation of recordings is directed by the investigating authority: ~~or an incident that is subject to mandatory reporting:~~
  - (A) flight recorders' recordings are not intentionally erased;
  - (B) flight recorders are deactivated immediately after the flight is completed; and
  - (C) ~~are reactivated only with the agreement of the investigating authority~~ precautionary measures to preserve the recordings of flight recorders are taken before leaving the flight crew compartment.

(...)

#### **NCC.GEN.145 Preservation, production and use of flight recorder recordings**

- (a) Following an accident ~~or an incident that is subject to mandatory reporting~~, a serious incident, or if directed by the investigating authority, the operator of an aircraft shall preserve the original recorded data for a period of 60 days ~~unless~~ or until otherwise directed by the investigating authority.

(...)

- (f) Without prejudice to Regulation (EU) No 996/2010:

- (1) ~~CVR recordings shall only be used for purposes other than for the investigation of an accident or an incident subject to mandatory reporting, if all crew members and maintenance personnel concerned consent; and~~ CVR recordings shall not be used for purposes other than the investigation by a safety investigating authority, by the competent authority or by the administration of justice, or for ensuring the CVR serviceability, unless:
  - (i) a procedure related to the handling of CVR recordings and of their transcript is in place; and
  - (ii) all crew members and maintenance personnel concerned have given their prior consent;

(..)

### **SUBPART D – INSTRUMENTS, DATA AND EQUIPMENT**

#### **Section 1 – Aeroplanes**

#### **NCC.IDE.A.160 Cockpit voice recorder**

(...)

- (b) The CVR shall be capable of retaining data recorded during at least ~~the preceding 2 hours~~:
  - (1) the preceding 20 hours for aeroplanes with an MCTOM of more than 27 000 kg and first issued with an individual CofA on or after 1 January 2020; or
  - (2) the preceding 2 hours for aeroplanes with an MCTOM of up to 27 000 kg or that were first issued with an individual CofA before 1 January 2020.

(...)



- (f) If the CVR is not deployable, it ~~The CVR~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

#### **NCC.IDE.A.165 Flight data recorder**

(...)

- (e) If the FDR is not deployable, it ~~The FDR~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

#### **NCC.IDE.A.170 Data link recording**

(...)

- (d) If the recorder is not deployable, it ~~The recorder~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

(...)

### **Section 2 – Helicopters**

#### **NCC.IDE.H.160 Cockpit voice recorder**

(...)

- (f) If the CVR is not deployable, it ~~The CVR~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

#### **NCC.IDE.H.165 Flight data recorder**

(...)

- (e) If the FDR is not deployable, it ~~The FDR~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

#### **NCC.IDE.H.170 Data link recording**

(...)

- (d) If the recorder is not deployable, it ~~The recorder~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

(...)

### **3.3. Draft amendment to Annex VII (Part-SPO)**

#### **SPO.GEN.107 Pilot-in-command responsibilities and authority**

- (a) The pilot-in-command shall be responsible for:

(...)

- (9) ensuring that: ~~when installed, flight recorders:~~

- (i) flight recorders are not disabled or switched off during flight; and
- (ii) in the event of an occurrence other than an accident or a serious incident that shall be reported according to ORO.GEN.160(a), flight recorders' recordings are not intentionally erased; and
- (iii) in the event of an accident, a serious incident or if preservation of recordings of flight recorders is directed by the investigating authority: ~~or an incident that is subject to mandatory reporting:~~
  - (A) flight recorders' recordings are not intentionally erased;
  - (B) flight recorders are deactivated immediately after the flight is completed; and
  - (C) ~~are reactivated only with the agreement of the investigating authority~~ precautionary measures to preserve the recordings of flight recorders are taken before leaving the flight crew compartment;

(...)

#### **SPO.GEN.145 Preservation, production and use of flight recorder recordings – operations with complex motor-powered aircraft**

- (a) Following an accident or a serious incident or if directed by the investigating authority, the operator of an aircraft shall preserve the original recorded data for a period of 60 days ~~unless or until~~ otherwise directed by the investigating authority.

(...)

- (1) ~~CVR recordings shall only be used for purposes other than for the investigation of an accident or an incident subject to mandatory reporting if all crew members and maintenance personnel concerned consent.~~ CVR recordings shall not be used for purposes other than the investigation by a safety investigating authority, by the competent authority or by the administration of justice, or for ensuring the CVR serviceability, unless:
  - (i) A procedure related to the handling of CVR recordings and of their transcript is in place; and
  - (ii) all crew members and maintenance personnel concerned have given their prior consent.

### **SUBPART D – INSTRUMENTS, DATA AND EQUIPMENT**

#### **Section 1 – Aeroplanes**

#### **SPO.IDE.A.140 Cockpit voice recorder**

(...)

- (b) The CVR shall be capable of retaining data recorded during at least ~~the preceding 2 hours:~~
  - (1) the preceding 20 hours for aeroplanes with an MCTOM of more than 27 000 kg and first issued with an individual CofA on or after 01 January 2020; or
  - (2) the preceding 2 hours for aeroplanes with an MCTOM of up to 27 000 kg or that were first issued with an individual CofA before 1 January 2020.

(...)

- (f) If the CVR is not deployable, it ~~The CVR~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

**SPO.IDE.A.145 Flight data recorder**

(...)

- (e) If the FDR is not deployable, it ~~The FDR~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

**SPO.IDE.A.150 Data link recording**

(...)

- (d) If the recorder is not deployable, it ~~The recorder~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

(...)

**Section 2 – Helicopters****SPO.IDE.H.140 Cockpit voice recorder**

(...)

- (f) If the CVR is not deployable, it ~~The CVR~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

**SPO.IDE.H.145 Flight data recorder**

(...)

- (e) If the FDR is not deployable, it ~~The FDR~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

**SPO.IDE.H.150 Data link recording**

(...)

- (d) If the recorder is not deployable, it ~~The recorder~~ shall have a device to assist in locating it in water. On or after 1 January 2020, this device shall have a minimum underwater transmission time of 90 days.

(...)

## 4. Draft amendment to AMC/GM to Regulation (EU) No 965/2012

### 4.1. Draft amendment to AMC/GM to Annex III (Part-ORO)

#### AMC2 ORO.MLR.100 Operations manual – General

CONTENTS – NON-COMMERCIAL OPERATIONS WITH COMPLEX MOTOR-POWERED AIRCRAFT

The OM should contain at least the following information, where applicable:

(...)

(q) ~~Use/protection of flight data recorder (FDR)/cockpit voice recorder (CVR) records, where applicable~~ Procedures for the preservation of recordings of the flight recorders, in order to prevent inadvertent reactivation, repair or reinstallation of the flight recorders following an accident or a serious incident or when this preservation is directed by the investigation authority.

(..)

#### AMC3 ORO.MLR.100 Operations manual – General

CONTENTS – COMMERCIAL AIR TRANSPORT OPERATIONS

(a) The OM should contain at least the following information, where applicable, as relevant for the area and type of operation:

A GENERAL/BASIC

(...)

11 HANDLING, NOTIFYING AND REPORTING ACCIDENTS, INCIDENTS AND OCCURRENCES

Procedures for handling, notifying and reporting accidents, incidents and occurrences. This section should include the following:

(...)

(g) Procedures for the preservation of recordings of the flight recorders following a ~~reportable event~~ an accident or a serious incident or when so directed by the investigation authority. These procedures should include:

(1) a full quote of CAT.GEN.MPA.195(a); and

(2) instructions and means to prevent inadvertent reactivation, repair or reinstallation of the flight recorders by personnel of the operator or of third parties, and to ensure that flight recorder recordings are preserved for the needs of the investigating authority.

(...)

B AIRCRAFT OPERATING MATTERS – TYPE RELATED

Taking account of the differences between types/classes, and variants of types, under the following headings:

(...)

13 PROCEDURES FOR THE PRESERVATION OF FLIGHT RECORDER RECORDINGS FOLLOWING AN ACCIDENT OR A SERIOUS INCIDENT OR WHEN SO DIRECTED BY THE INVESTIGATION AUTHORITY

13.1 A full quote of the following standard text:

'According to accident investigation rules, any person involved in an investigated occurrence shall take all necessary steps to preserve documents, material and

recordings in relation to the event, in particular so as to prevent erasure of recordings of conversations and alarms after the flight. According to air operation rules, the commander or the pilot-in-command is responsible for the preservation of the recordings of flight recorders.'

13.2 Instructions and means for the flight crew to deactivate the flight recorders immediately after completion of the flight and inform relevant personnel that the flight recorder recordings shall be preserved.

(...)

#### **AMC4 ORO.MLR.100 Operations manual – General**

##### CONTENTS – NON-COMMERCIAL SPECIALISED OPERATIONS WITH COMPLEX MOTOR-POWERED AIRCRAFT AND COMMERCIAL SPECIALISED OPERATIONS

(a) The OM should contain at least the following information, where applicable, as relevant for the area and type of operation:

#### A GENERAL/BASIC

(...)

#### 11 HANDLING, NOTIFYING AND REPORTING ACCIDENTS, INCIDENTS AND OCCURRENCES

Procedures for handling, notifying and reporting accidents, incidents and occurrences. This section should include:

11.1 Definitions of accidents and occurrences and responsibilities of all persons involved;

11.2 Reporting procedures (including any mandatory forms);

11.3 Special notification when dangerous goods are carried

11.4 Procedures for the preservation of recordings of the flight recorders, in order to prevent inadvertent reactivation, repair or reinstallation of the flight recorders following an accident or a serious incident or when this preservation is directed by the investigation authority.

#### B AIRCRAFT OPERATING MATTERS – TYPE RELATED

For chapters 0-1 refer to AMC3 ORO.MLR.100.

(...)

#### 13 PROCEDURES FOR THE PRESERVATION OF FLIGHT RECORDER RECORDINGS FOLLOWING AN ACCIDENT OR A SERIOUS INCIDENT OR WHEN SO DIRECTED BY THE INVESTIGATING AUTHORITY

13.1 A full quote of the following standard text:

'According to accident investigation rules, any person involved in an investigated occurrence shall take all necessary steps to preserve documents, material and recordings in relation to the event, in particular so as to prevent erasure of recordings of conversations and alarms after the flight. According to air operation rules, the pilot-in-command is responsible for the preservation of the recordings of flight recorders.'

13.2 Instructions and means for the pilot-in-command to deactivate the flight recorders immediately after completion of the flight and inform relevant personnel that the flight recorder recordings shall be preserved.

## 4.2. Draft amendment to AMC/GM to Annex IV (Part-CAT)

### GM1 CAT.GEN.MPA.105(a)(10) Responsibilities of the commander

#### IDENTIFICATION OF THE SEVERITY OF AN OCCURRENCE BY THE COMMANDER

The definitions of an accident and a serious incident as well as examples thereof can be found in Regulation (EU) No 996/2010 of the European Parliament and of the Council.

### AMC1 CAT.GEN.MPA.195(a) Preservation, production and use of flight recorder recordings

#### PRESERVATION OF RECORDED DATA FOR INVESTIGATION

- (a) The operator should establish procedures to ensure that flight recorder recordings are preserved for the investigating authority.
- (b) These procedures should include:
  - (1) instructions for flight crew members to deactivate the flight recorders immediately after completion of the flight and inform relevant personnel that the recording of the flight recorders should be preserved; and
  - (2) instructions to prevent inadvertent reactivation, test, repair or reinstallation of the flight recorders by operator personnel or during maintenance or ground handling activities performed by third parties.

### GM1 CAT.GEN.MPA.195(a) Preservation, production and use of flight recorder recordings

#### REMOVAL OF RECORDERS IN CASE OF AN INVESTIGATION

The need for removal of the recorders from the aircraft is determined by the investigating authority with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

### AMC1 CAT.GEN.MPA.195(b) Preservation, production and use of flight recorder recordings

#### OPERATIONAL CHECKS AND INSPECTIONS OF RECORDINGS

Whenever a recorder is required to be carried, ~~the operator should:~~

- (a) the operator should perform an ~~annual~~ inspection of FDR recording and CVR recording ~~every year~~, unless one or more of the following applies:
  - (1) If the flight recorder is recording on magnetic wire or is using frequency modulation technology, the time interval between two inspections of the recording should not exceed 3 months.
  - (1) ~~Where two solid state FDRs both fitted with internal built in test equipment sufficient to monitor reception and recording of data share the same acquisition unit, a comprehensive recording inspection need only be performed for one FDR. For the second FDR, checking its internal built in test equipment is sufficient. The inspection should be performed alternately such that each FDR is inspected once every other year.~~
  - (2) If the flight recorder is solid-state and the flight recorder system is fitted with continuous monitoring for proper operation, the time interval between two inspections of the recording may be up to 2 years.

- (3) In the case of an aircraft equipped with two solid-state flight data and cockpit voice combination recorders, where
- (i) the flight recorder systems are fitted with continuous monitoring for proper operation, and
  - (ii) the flight recorders share the same flight data acquisition,
- a comprehensive inspection of the recording need only to be performed for one flight recorder position. The inspection should be performed alternately such that each flight recorder position is inspected at least every 4 years.
- (4)(2) Where all of the following conditions are met, the FDR recording inspection of the FDR recording is not needed:
- (i) the aircraft flight data are collected in the frame of a flight data monitoring (FDM) programme;
  - (ii) the data acquisition of mandatory flight parameters is the same for the FDR and for the recorder used for the FDM programme;
  - (iii) the integrity of all mandatory flight parameters is verified by the FDM programme; mean inspection similar to the inspection of the FDR recording and covering all mandatory flight parameters is conducted on the FDM data at time intervals not exceeding 2 years; and
  - (iv) the FDR is solid-state and the FDR system is fitted with continuous monitoring for proper operation; an internal built-in test equipment sufficient to monitor reception and recording of data.
- ~~(3) Where two solid-state CVRs are both fitted with internal built-in test equipment sufficient to monitor reception and recording of data, a comprehensive recording inspection need only to be performed for one CVR. For the second CVR, checking its internal built-in test equipment is sufficient. The inspection should be performed alternately such that each CVR is inspected once every other year.~~
- (b) the operator should perform every 5 years an inspection of the data link recording.
- (c) when installed, the aural or visual means for pre-flight checking the flight recorders for proper operation should be used every day. When no such means is available for a flight recorder, the operator should perform an operational check of this flight recorder at time intervals not exceeding 7 days.
- (e)(d) the operator should check every 5 years, or in accordance with the recommendations of the sensor manufacturer, that the parameters dedicated to the FDR and not monitored by other means are being recorded within the calibration tolerances and that there is no discrepancy in the engineering conversion routines for these parameters.

### **GM1 CAT.GEN.MPA.195(b) Preservation, production and use of flight recorders recordings**

#### INSPECTION OF THE FLIGHT RECORDERS RECORDINGS

- (a) The inspection of the FDR recording usually consists of the following:
- (1) Making a copy of the complete recording file.
  - (2) Converting the recording to parameters expressed in engineering units in accordance with the documentation required to be held.

- (2)(3) Examining a whole flight in engineering units to evaluate the validity of all mandatory parameters - this could reveal defects or noise in the measuring and processing chains and indicate necessary maintenance actions. The following should be considered:
- (i) when applicable, each parameter should be expressed in engineering units and checked for different values of its operational range - for this purpose, some parameters may need to be inspected at different flight phases; and
  - (ii) if the parameter is delivered by a digital data bus and the same data are utilised for the operation of the aircraft, then a reasonableness check may be sufficient; otherwise a correlation check may need to be performed;
    - (A) a reasonableness check is understood in this context as a subjective, qualitative evaluation, requiring technical judgement, of the recordings from a complete flight; and
    - (B) a correlation check is understood in this context as the process of comparing data recorded by the flight data recorder against the corresponding data derived from flight instruments, indicators or the expected values obtained during specified portion(s) of a flight profile or during ground checks that are conducted for that purpose.
- (3)(4) Retaining the most recent copy of the complete recording file and the corresponding recording inspection report, that includes references to the documentation required to be held.

(...)

## **GM2 CAT.GEN.MPA.195(b) Preservation, production and use of flight recorders recordings**

### **MONITORING AND CHECKING THE PROPER OPERATION OF FLIGHT RECORDERS – EXPLANATION OF TERMS**

For the understanding of the terms used in AMC1 CAT.GEN.MPA.195(b):

- (a) 'operational check of the flight recorder' means a check of the flight recorder for proper operation. It is not a check of the quality of the recording, and therefore it is not equivalent to an inspection of the recording. This check can be carried out by the flight crew or through a maintenance task.
- (b) 'aural or visual means for pre-flight checking a flight recorder for proper operation' means an aural or visual means for the flight crew to check before the flight, the results of an automatically or manually initiated test of the flight recorder for proper operation. Such a means provide for an operational check that can be performed by the flight crew.
- (c) 'flight recorder system' means the flight recorder, its dedicated sensors and transducers and its dedicated acquisition and processing equipment.
- (d) 'continuous monitoring for proper operation' means for a flight recorder system, a combination of system monitors and built-in test functions which operates continuously in order to detect the following:
  - (1) Loss of electrical power to the flight recorder system;
  - (2) Failure of the equipment performing acquisition and processing;
  - (3) Failure of the recording medium and/or drive mechanism; and



- (4) Failure of the recorder to store the data in the recording medium as shown by checks of the recorded data including, as reasonably practicable for the storage medium concerned, correct correspondence with input data.

### **AMC1 CAT.GEN.MPA.195(f) Preservation, production and use of flight recorders recordings**

#### **USE OF CVR RECORDINGS**

- (a) The procedure related to the handling of CVR recordings should be written in a document which should be signed by all parties (airline management, crew member representatives nominated either by the union or the crew themselves, maintenance personnel representatives if applicable). This procedure should, as a minimum, define:
- (1) the method to obtain the consent of all crew members and maintenance personnel concerned;
  - (2) an access and security policy that restrict access to CVR recordings and CVR transcripts to specifically authorised persons identified by their position; and
  - (3) a retention policy and accountability, including the measures taken to ensure the security of CVR recordings and CVR transcripts.
- (b) Each time a CVR recording file is read out for purposes other than investigation by a safety investigating authority, the competent authority or the administration of justice, and other than for ensuring the CVR serviceability:
- (1) the operator should delete without delay all parts of the CVR recording file that contain information with a privacy content, and it should not permit that such information is transcribed.
  - (2) the operator should not permit this CVR recording file or any transcript of it to be used for other than safety-related purposes.
  - (3) the operator should retain, and when requested provide to the competent authority:
    - (i) information on the use made (or the intended use) of the CVR recording; and
    - (ii) evidence that the persons concerned consented to the use made (or the intended use) of the CVR recording file.

### **GM1 CAT.GEN.MPA.195(f) Preservation, production and use of flight recorders recordings**

#### **USE OF CVR RECORDINGS**

- (a) The CVR is primarily a tool for the investigation of accidents and serious incidents by investigating authorities. It is not meant to be used by an operator for monitoring operations. Misuse of CVR recordings is a breach of the right to privacy and it works against an effective safety culture inside the operator.
- (b) It is noteworthy that the FDR may be used for a flight data monitoring (FDM) programme, however in that case the principles of confidentiality and access restriction of the FDM programme apply to the FDR recordings. Because the CVR is recording the voices of the crew and verbal communications with a privacy content, the CVR recording must be handled with even more care than FDM data.

- (c) Therefore, the use of a CVR recording, when not dictated by an authority or needed for assessing the CVR serviceability, should be subject to the free consent of the persons concerned, and framed by a procedure that is recognised by all parties and that protects the privacy of crew members and (if applicable) maintenance staff. The competent authority is entitled to control that the use of CVR recordings made by an operator complies with these principles.

## Subpart D – Instruments, data, equipment

### Section 1 – Aeroplanes

#### AMC1 CAT.IDE.A.285(f) Flight over water

##### LOW-FREQUENCY UNDERWATER LOCATING DEVICE

- (a) The underwater locating device should be compliant with ETSO-C200 or equivalent.
- (b) The underwater locating device should not be installed in wings or empennage.

#### AMC2 CAT.IDE.A.285(f) Flight over water

##### AUTOMATIC MEANS TO DETERMINE THE LOCATION OF THE POINT OF END OF FLIGHT AFTER AN ACCIDENT WHERE THE AIRCRAFT IS SEVERELY DAMAGED

- (a) The automatic means to determine, following an accident where the aircraft is severely damaged, the location of the point of end of flight within 6 NM accuracy should:
- (1) be operational whenever the aeroplane is airborne;
  - (2) be so designed that it is very likely to work, indistinctively if the accident is survivable or not;
  - (3) be robust to loss of normal electrical power on board;
  - (4) not offer any control to disable it during the flight;
  - (5) work at most locations on Earth, including oceanic areas and remote land areas; and
  - (6) be so designed that the location of the point of impact can be determined within 6 NM accuracy and within 3 hours of the accident time.
- (b) The automatic means to determine, following an accident where the aircraft is severely damaged, the location of the point of end of flight within 6 NM accuracy may use any technology. However, an automatic fixed ELT or an automatic portable ELT are not acceptable for this purpose if they are not designed to successfully emit in extreme non-survivable accident conditions or to emit upon automatic detection of an emergency situation or a situation likely to result into an accident. In addition, an automatic deployable ELT that only relies on water immersion sensors and negative acceleration sensors ('g' switches) for detecting impact with water or ground is not acceptable.

#### GM1 CAT.IDE.A.285(f) Flight over water

##### AUTOMATIC MEANS TO DETERMINE THE LOCATION OF THE POINT OF END OF FLIGHT AFTER AN ACCIDENT WHERE THE AIRCRAFT IS SEVERELY DAMAGED

For the purpose of the automatic means to determine the location of the point of end of flight,

- (a) 'accident where the aircraft is severely damaged' means an accident where the aircraft sustains damage or structural failure which adversely affects the structural strength,

performance or flight characteristics of the aircraft, and would normally require major repair or replacement of the affected component, except:

- (1) for engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories);
- (2) when the damage is limited to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes); or
- (3) in case of minor damages to main rotor blades, tail rotor blades, landing gear, or minor damages resulting from hail or bird strike (including holes in the radome).

### **GM2 CAT.IDE.A.285(f) Flight over water**

**AUTOMATIC MEANS TO DETERMINE THE LOCATION OF THE POINT OF END OF FLIGHT AFTER AN ACCIDENT WHERE THE AIRCRAFT IS SEVERELY DAMAGED**

- (a) Historical data of large aeroplane accidents that occurred in the 1990s and 2000s have shown that quite frequently the ELT, while compliant with industry standards, did not emit a signal because it was destroyed, its antenna was destroyed or the link between the ELT and the antenna was cut. It is expected that if used to comply with CAT.IDE.A.285(f)(2), an automatic fixed ELT or an automatic portable ELT would be capable of emitting a signal upon detection of an emergency situation (i.e. before the time of impact) or that the ELT would be designed to successfully emit a signal even in non-survivable accident conditions.
- (b) Historical data of helicopter accidents in the 1990s and 2000s have revealed many cases of unintended deployment or missed deployment of automatic deployable ELTs due to their negative acceleration sensors ('g' switches). Several cases of premature end of recording with flight recorders installed on board aeroplane and helicopters involved in accidents have raised concern about the reliability of 'g' switches for detecting impact initiation. This is why EUROCAE Document 112 (Minimum Operational Performance Specifications for crash-protected airborne recorder systems) specifies that the impact sensors of an automatic deployable flight recorder should be designed such that they will only trigger when the structure has been significantly deformed, and that negative acceleration sensors should not be used as the sole means of detection. It is expected that if used to comply with CAT.IDE.A.285(f)(2), an automatic deployable ELT would have impact detection means as robust as those specified for automatic deployable flight recorders.
- (c) Examples of automatic means to determine the location of the point of impact with the Earth's surface within 6 NM accuracy are:
  - (1) periodic transmission by the aeroplane of its latitude and longitude, from take-off to landing, at time intervals not exceeding 1 minute and to a ground infrastructure where they are stored; the transmission would be successful from most locations on Earth and robust to loss of normal electrical power on board, and there would be no control to disable the transmission in flight;
  - (2) emission by the aeroplane of a signal upon detection of an emergency situation or a situation likely to result into an accident. The emission would start within seconds of detection and continue until the detection criteria have disappeared. The emission would be robust to high aircraft attitudes and to loss of normal electrical power on board and there would be no control to disable the transmission in flight. There would be reliable ground infrastructure to receive the emergency signal, store it and trigger an alert. The signal would contain position information or post-processing of the signal would allow determining the aircraft position. Examples of criteria triggering transmission are: unusual aircraft attitude, unusual airspeed or vertical speed, stall,

excessive accelerations, GPWS/TAWS hard warning, ACAS/TCAS Resolution Advisory, cabin altitude warning, fire warning, multiple engine failure;

- (3) an automatic deployable flight recorder fitted with an ELT, compliant with ETSO-C123b, ETSO-C124b, ETSO-C177 or equivalent. There would be no control to disable the automatic deployment function in flight.

### 4.3. Draft amendment to AMC/GM to Annex III (Part-NCC)

#### **GM1 NCC.GEN.106(a)(9) Pilot-in-command responsibilities and authority**

##### IDENTIFICATION OF THE SEVERITY OF AN OCCURRENCE BY THE PILOT-IN-COMMAND

The definitions of an accident and a serious incident as well as examples thereof can be found in Regulation (EU) No 996/2010 of the European Parliament and of the Council.

#### **AMC1 NCC.GEN.145(a) Preservation, production and use of flight recorder recordings**

##### PRESERVATION OF RECORDED DATA FOR THE INVESTIGATION

- (a) The operator should establish procedures to ensure that flight recorder recordings are preserved for the investigating authority.
- (b) The procedures should include:
- (1) instructions for flight crew members to deactivate the flight recorders immediately after completion of the flight and inform relevant personnel that the recording of the flight recorders should be preserved; and
  - (2) instructions to prevent inadvertent reactivation, test, repair or reinstallation of the flight recorders by any operator personnel, or during maintenance or ground handling activities performed by third parties.

#### **GM1 NCC.GEN.145(a) Preservation, production and use of flight recorder recordings**

##### REMOVAL OF RECORDERS AFTER A REPORTABLE OCCURRENCE IN CASE OF AN INVESTIGATION

The need for removal of the recorders from the aircraft is determined by the investigating authority with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

#### **AMC1 NCC.GEN.145(b) Preservation, production and use of flight recorder recordings**

##### OPERATIONAL CHECKS AND INSPECTIONS OF RECORDINGS

Whenever a recorder is required to be carried, the operator should:

- (a) the operator should perform an annual inspection of flight data recorder (FDR) recording and cockpit voice recorder (CVR) recording. FDR recording and CVR recording every year, unless one or more of the following applies:
- (1) If the flight recorder is recording on magnetic wire or is using frequency modulation technology, the time interval between 2 inspections of the recording should not exceed 3 months.
  - (1) ~~Where two solid state FDRs both fitted with internal built-in test equipment sufficient to monitor reception and recording of data share the same acquisition unit, a comprehensive recording inspection need only be performed for one FDR. For the second FDR, checking its internal built-in test equipment is sufficient. The inspection should be performed alternately such that each FDR is inspected once every other year.~~
  - (2) If the flight recorder is solid-state and the flight recorder system is fitted with continuous monitoring for proper operation, the time interval between two inspections of the recording may be up to 2 years.
  - (3) In the case of an aircraft equipped with two solid-state flight data and cockpit voice combination recorders, where

- (i) the flight recorder systems are fitted with continuous monitoring for proper operation, and
- (ii) the flight recorders share the same flight data acquisition unit,
- a comprehensive inspection of the recording needs only to be performed for one flight recorder position. The inspection should be performed alternately such that each flight recorder position is inspected at least every 4 years.
- ~~(2)~~ (4) Where all of the following conditions are met, the FDR recording inspection of FDR recording is not needed:
- (i) the aircraft flight data are collected in the frame of a flight data monitoring (FDM) programme;
- (ii) the data acquisition of mandatory flight parameters is the same for the FDR and for the recorder used for the FDM programme;
- (iii) an inspection similar to the inspection of the FDR recording and covering all mandatory flight parameters, is conducted on the FDM data at time intervals not exceeding 2 years the integrity of all mandatory flight parameters is verified by the FDM programme; and
- (iv) the FDR is solid-state and the FDR system is fitted with continuous monitoring for proper operation an internal built-in test equipment sufficient to monitor reception and recording of data.
- ~~(3) Where two solid state CVRs are both fitted with internal built-in test equipment sufficient to monitor reception and recording of data, a comprehensive recording inspection need only to be performed for one CVR. For the second CVR, checking its internal built-in test equipment is sufficient. The inspection should be performed alternately such that each CVR is inspected once every other year.~~
- (b) the operator should perform every 5 years an inspection of the data link recording.
- (c) when installed, the aural or visual means for pre-flight checking the flight recorders for proper operation should be used every day. When no such means is available for a flight recorder, the operator should perform an operational check of this flight recorder at time intervals not exceeding 7 days.
- ~~(e)~~(d) the operator should check every 5 years, or in accordance with the recommendations of the sensor manufacturer, that the parameters dedicated to the FDR and not monitored by other means are being recorded within the calibration tolerances and that there is no discrepancy in the engineering conversion routines for these parameters.

### **GM1 NCC.GEN.145(b) Preservation, production and use of flight recorder recordings**

#### INSPECTION OF THE FLIGHT RECORDERS RECORDINGS

- (a) The inspection of the FDR recording usually consists of the following:
- (1) Making a copy of the complete recording file;
- (2) Converting the recording to parameters expressed in engineering units in accordance with the documentation required to be held ;
- ~~(2)~~(3) Examining a whole flight in engineering units to evaluate the validity of all mandatory parameters - this could reveal defects or noise in the measuring and processing chains and indicate necessary maintenance actions. The following should be considered:

(i) when applicable, each parameter should be expressed in engineering units and checked for different values of its operational range - for this purpose, some parameters may need to be inspected at different flight phases; and  
(ii) if the parameter is delivered by a digital data bus and the same data are utilised for the operation of the aircraft, then a reasonableness check may be sufficient; otherwise a correlation check may need to be performed;

- (A) a reasonableness check is understood in this context as a subjective, qualitative evaluation, requiring technical judgement, of the recordings from a complete flight; and
- (B) a correlation check is understood in this context as the process of comparing data recorded by the flight data recorder against the corresponding data derived from flight instruments, indicators or the expected values obtained during specified portion(s) of a flight profile or during ground checks that are conducted for that purpose.

~~(3)~~(4) Retaining the most recent copy of the complete recording file and the corresponding recording inspection report, that includes references to the documentation required to be held.

(...)

## **GM2 NCC.GEN.145(b) Preservation, production and use of flight recorders recordings**

### **MONITORING AND CHECKING THE PROPER OPERATION OF FLIGHT RECORDERS – EXPLANATION OF TERMS**

For the understanding of the terms used in AMC1 NCC.GEN.145(b):

- (a) 'operational check of the flight recorder' means a check of the flight recorder for proper operation. It is not a check of the quality of the recording, and, therefore, it is not equivalent to an inspection of the recording. This check can be carried out by the flight crew or through a maintenance task.
- (b) 'aural or visual means for pre-flight checking a flight recorder for proper operation' means an aural or visual means for the flight crew to check, before the flight, the results of an automatically or manually initiated test of the flight recorder for proper operation. Such a means provides for an operational check that can be performed by the flight crew.
- (c) 'flight recorder system' means the flight recorder, its dedicated sensors and transducers and its dedicated acquisition and processing equipment.
- (d) 'continuous monitoring for proper operation' means for a flight recorder system, a combination of system monitors and built-in test functions which operates continuously in order to detect the following:
  - (1) Loss of electrical power to the flight recorder system;
  - (2) Failure of the equipment performing acquisition and processing;
  - (3) Failure of the recording medium and/or drive mechanism; and
  - (4) Failure of the recorder to store the data in the recording medium as shown by checks of the recorded data including, as reasonably practicable for the storage medium concerned, correct correspondence with input data.

**AMC1 NCC.GEN.145(f) Preservation, production and use of flight recorders recordings****USE OF CVR RECORDINGS**

For the understanding of the terms used in AMC1 NCC.GEN.145(b):

- (a) The procedure related to the handling of CVR recordings should be written in a document which should be signed by all parties (airline management, crew member representatives nominated either by the union or the crew themselves, maintenance personnel representatives if applicable). This procedure should, as a minimum, define:
- (1) the method to obtain the consent of all crew members and maintenance personnel concerned;
  - (2) an access and security policy that restrict access to CVR recordings and CVR transcripts to specifically authorised persons identified by their position; and
  - (3) a retention policy and accountability, including the measures taken to ensure the security of CVR recordings and CVR transcripts.
- (b) Each time a CVR recording file is read out for purposes other than investigation by a safety investigating authority, the competent authority or the administration of justice, and other than for ensuring the CVR serviceability,:
- (1) the operator should delete without delay all parts of the CVR recording file that contain information with a privacy content, and it should not permit that such information is transcribed.
  - (2) the operator should retain, and, when requested, provide to the competent authority:
    - (i) information on the use made (or the intended use) of the CVR recording; and
    - (ii) evidence that the persons concerned consented to the use made (or the intended use) of the CVR recording file.

**GM1 NCC.GEN.145(f) Preservation, production and use of flight recorders recordings****USE OF CVR RECORDINGS**

- (a) The CVR is primarily a tool for the investigation of accidents and serious incidents by investigating authorities. It is not meant to be used by an operator for monitoring operations. Misuse of CVR recordings is a breach of the right to privacy and it works against an effective safety culture inside the operator.
- (b) It is noteworthy that the FDR may be used for a flight data monitoring (FDM) programme, however, in that case, the principles of confidentiality and access restriction of the FDM programme apply to the FDR recordings. Because the CVR is recording the voices of the crew and verbal communications with a privacy content, the CVR recording must be handled with even more care than FDM data.
- (c) Therefore, the use of a CVR recording, when not dictated by an authority or needed for assessing the CVR serviceability, should be subject to the free consent of the persons concerned, and framed by a procedure that is recognised by all parties and that protects the privacy of crew members and (if applicable) maintenance staff. The competent authority is entitled to control that the use of CVR recordings made by an operator complies with these principles.



#### 4.4. Draft amendment to AMC/GM to Annex III (Part-SPO)

##### **GM1 SPO.GEN.107(a)(9) Pilot-in-command responsibilities and authority**

###### IDENTIFICATION OF THE SEVERITY OF AN OCCURRENCE BY THE PILOT-IN-COMMAND

The definitions of an accident and a serious incident, as well as examples thereof, can be found in Regulation (EU) No 996/2010 of the European Parliament and of the Council.

##### **AMC1 SPO.GEN.145(a) Preservation, production and use of flight recorder recordings – operations with complex motor-powered aircraft**

###### PRESERVATION OF RECORDED DATA FOR THE INVESTIGATION

- (a) The operator should establish procedures to ensure that flight recorder recordings are preserved for the investigating authority.
- (b) These procedures should include:
  - (1) instructions for flight crew members to deactivate the flight recorders immediately after completion of the flight and inform relevant personnel that the recording of the flight recorders should be preserved; and
  - (2) instructions to prevent inadvertent reactivation, test, repair or reinstallation of the flight recorders by any operator personnel, or during maintenance or ground handling activities performed by third parties.

##### **GM1 SPO.GEN.145(a) Preservation, production and use of flight recorder recordings – operations with complex motor-powered aircraft**

###### REMOVAL OF RECORDERS AFTER A REPORTABLE OCCURRENCE IN CASE OF AN INVESTIGATION

The need for removal of the recorders from the aircraft is determined by the investigating authority with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

##### **AMC1 SPO.GEN.145(b) Preservation, production and use of flight recorder recordings – operations with complex motor-powered aircraft**

###### OPERATIONAL CHECKS AND INSPECTIONS OF RECORDINGS

Whenever a recorder is required to be carried, the operator should:

- (a) the operator should perform an annual inspection of flight data recorder (FDR) recording and cockpit voice recorder (CVR) recording FDR recording and CVR recording every year, unless one or more of the following applies:
  - (1) If the flight recorder is recording on magnetic wire or is using frequency modulation technology, the time interval between two inspections of the recording should not exceed 3 months.
  - (2) If the flight recorder is solid-state and the flight recorder system is fitted with continuous monitoring for proper operation, the time interval between two inspections of the recording may be up to 2 years.
  - (3) In the case of an aircraft equipped with two solid-state flight data and cockpit voice combination recorders, where
    - (i) the flight recorder systems are fitted with continuous monitoring for proper operation, and
    - (ii) the flight recorders share the same flight data acquisition unit,

A comprehensive inspection of the recording needs only to be performed for one flight recorder position. The inspection should be performed alternately such that each flight recorder position is inspected at least every 4 years.

- ~~(1)~~ Where two solid-state FDRs both fitted with internal built-in test equipment sufficient to monitor reception and recording of data share the same acquisition unit, a comprehensive recording inspection need only be performed for one FDR. For the second FDR, checking its internal built-in test equipment is sufficient. The inspection should be performed alternately such that each FDR is inspected once every other year.
- ~~(2)~~(4) Where all of the following conditions are met, the FDR recording inspection of the FDR recording is not needed:
- (i) the aircraft flight data are collected in the frame of a flight data monitoring (FDM) programme;
  - (ii) the data acquisition of mandatory flight parameters is the same for the FDR and for the recorder used for the FDM programme;
  - (iii) an inspection similar to the inspection of the FDR recording and covering all mandatory flight parameters, is conducted on the FDM data at time intervals not exceeding 2 years the integrity of all mandatory flight parameters is verified by the FDM programme; and
  - (iv) the FDR is solid-state and the FDR system is fitted with continuous monitoring for proper operation an internal built-in test equipment sufficient to monitor reception and recording of data.
- ~~(3)~~ Where two solid-state CVRs are both fitted with internal built-in test equipment sufficient to monitor reception and recording of data, a comprehensive recording inspection need only to be performed for one CVR. For the second CVR, checking its internal built-in test equipment is sufficient. The inspection should be performed alternately such that each CVR is inspected once every other year.
- (b) the operator should perform every 5 years an inspection of the data link recording.
- (c) when installed, the aural or visual means for pre-flight checking the flight recorders for proper operation should be used every day. When no such means is available for a flight recorder, the operator should perform an operational check of this flight recorder at time intervals not exceeding 7 days.
- ~~(e)~~(d) the operator should check every 5 years, or in accordance with the recommendations of the sensor manufacturer, that the parameters dedicated to the FDR and not monitored by other means are being recorded within the calibration tolerances and that there is no discrepancy in the engineering conversion routines for these parameters.

### **GM1 SPO.GEN.145(b) Preservation, production and use of flight recorder recordings**

#### INSPECTION OF THE FLIGHT RECORDERS RECORDINGS

- (a) The inspection of the FDR recording usually consists of the following:
- (1) Making a copy of the complete recording file.
  - (2) Converting the recording to parameters expressed in engineering units in accordance with the documentation required to be held.
- ~~(2)~~(3) Examining a whole flight in engineering units to evaluate the validity of all mandatory parameters - this could reveal defects or noise in the measuring and

processing chains and indicate necessary maintenance actions. The following should be considered:

- (i) when applicable, each parameter should be expressed in engineering units and checked for different values of its operational range - for this purpose, some parameters may need to be inspected at different flight phases; and
- (ii) if the parameter is delivered by a digital data bus and the same data are utilised for the operation of the aircraft, then a reasonableness check may be sufficient; otherwise a correlation check may need to be performed;
  - (A) a reasonableness check is understood in this context as a subjective, qualitative evaluation, requiring technical judgement, of the recordings from a complete flight; and
  - (B) a correlation check is understood in this context as the process of comparing data recorded by the flight data recorder against the corresponding data derived from flight instruments, indicators or the expected values obtained during specified portion(s) of a flight profile or during ground checks that are conducted for that purpose.

~~(3)~~(4) Retaining the most recent copy of the complete recording file and the corresponding recording inspection report, that includes references to the documentation required to be held.

## **GM2 SPO.GEN.145(b) Preservation, production and use of flight recorders recordings**

### **MONITORING AND CHECKING THE PROPER OPERATION OF FLIGHT RECORDERS – EXPLANATION OF TERMS**

For the understanding of the terms used in AMC1 SPO.GEN.145(b):

- (a) 'operational check of the flight recorder' means a check of the flight recorder for proper operation. It is not a check of the quality of the recording, and, therefore, it is not equivalent to an inspection of the recording. This check can be carried out by the flight crew or through a maintenance task.
- (b) 'aural or visual means for pre-flight checking a flight recorder for proper operation' means an aural or visual means for the flight crew to check, before the flight, the results of an automatically or manually initiated test of the flight recorder for proper operation. Such a means provides for an operational check that can be performed by the flight crew.
- (c) 'flight recorder system' means the flight recorder, its dedicated sensors and transducers and its dedicated acquisition and processing equipment.
- (d) 'continuous monitoring for proper operation' means for a flight recorder system, a combination of system monitors and built-in test functions which operate continuously in order to detect the following:
  - (1) Loss of electrical power to the flight recorder system;
  - (2) Failure of the equipment performing acquisition and processing;
  - (3) Failure of the recording medium and/or drive mechanism; and
  - (4) Failure of the recorder to store the data in the recording medium as shown by checks of the recorded data including, as reasonably practicable for the storage medium concerned, correct correspondence with input data.

**AMC1 SPO.GEN.145(f) Preservation, production and use of flight recorders recordings****USE OF CVR RECORDINGS**

For the understanding of the terms used in AMC1 SPO.GEN.145(b):

- (a) The procedure related to the handling of CVR recordings should be written in a document which should be signed by all parties (airline management, crew member representatives nominated either by the union or the crew themselves, maintenance personnel representatives if applicable). This procedure should, as a minimum, define:
  - (1) the method to obtain the consent of all crew members and maintenance personnel concerned;
  - (2) an access and security policy that restrict access to CVR recordings and CVR transcripts to specifically authorised persons identified by their position; and
  - (3) a retention policy and accountability, including the measures taken, to ensure the security of CVR recordings and CVR transcripts.
- (b) Each time a CVR recording file is read out for purposes other than investigation by a safety investigating authority, the competent authority or the administration of justice, and other than for ensuring the CVR serviceability:
  - (1) the operator should delete without delay all parts of the CVR recording file that contain information with a privacy content, and it should not permit that such information is transcribed.
  - (2) the operator should retain, and when requested provide to the competent authority:
    - (i) information on the use made (or the intended use) of the CVR recording; and
    - (ii) evidence that the persons concerned consented to the use made (or the intended use) of the CVR recording file.

**GM1 SPO.GEN.145(f) Preservation, production and use of flight recorders recordings****USE OF CVR RECORDINGS**

- (a) The CVR is primarily a tool for the investigation of accidents and serious incidents by investigating authorities. It is not meant to be used by an operator for monitoring operations. Misuse of CVR recordings is a breach of the right to privacy and it works against an effective safety culture inside the operator.
- (b) It is noteworthy that the FDR may be used for a flight data monitoring (FDM) programme, however, in that case the principles of confidentiality and access restriction of the FDM programme apply to the FDR recordings. Because the CVR is recording the voices of the crew and verbal communications with a privacy content, the CVR recording must be handled with even more care than FDM data.
- (c) Therefore, the use of a CVR recording, when not dictated by an authority or needed for assessing the CVR serviceability, should be subject to the free consent of the persons concerned, and framed by a procedure that is recognised by all parties and that protects the privacy of crew members and (if applicable) maintenance staff. The competent authority is entitled to control that the use of CVR recordings made by an operator complies with these principles.

## 5. Individual comments and responses

In responding to comments, a standard terminology has been applied to attest the Agency's position. This terminology is as follows:

- (a) **Accepted** — The Agency agrees with the comment and any proposed amendment is wholly transferred to the revised text.
- (b) **Partially accepted** — The Agency either agrees partially with the comment, or agrees with it but the proposed amendment is only partially transferred to the revised text.
- (c) **Noted** — The Agency acknowledges the comment but no change to the existing text is considered necessary.
- (d) **Not accepted** — The comment or proposed amendment is not shared by the Agency.

<b>(General Comments)</b>	-
---------------------------	---

comment	9	<p style="text-align: right;">comment by: <i>CAA-Denmark</i></p> <p>CAA-Denmark acknowledges the proposed amendment as an improvement to safety and to facilitating investigation. However, CAA-Denmark urges EASA to carefully consider the proportionality of the improvements in relation to the extra costs for the airline industry for investments in new equipment.</p>
response		<p>Not accepted.</p> <p>The economic impact and the impact on proportionality were carefully considered in each regulatory impact assessment (RIA) of NPA 2013-26. Indeed, each RIA contains a section titled 'analysis of impact' which contains a detailed analysis of the safety, social, economic and environmental impacts as well as the impact on proportionality and rules harmonisation. It is, therefore, considered that no additional impact assessment is necessary.</p>
comment	10	<p style="text-align: right;">comment by: <i>Thomson Airways</i></p> <p>Thomson Airways have no comments in regard to the Cockpit voice recorder requirements as all equipment installed across the Thomson fleet is currently compliant.</p> <p>In regard to the new ELT requirements (90 days &amp; 8.8Khz) Thomson Airways have been unable to identify a replacement which meets these new specifications. As such a full evaluation of this proposal can not be performed and on that basis Thomson would like to reject this proposal. Unless EASA are aware of a viable ELT on the market then this proposal should be withdrawn.</p>
response		<p>Not accepted.</p> <p>Two equipment manufacturers offer models of underwater locating devices (ULDs) for flight recorders which have a transmission time of 90 days. These models comply with ETSO-c121a.</p> <p>In addition, the Agency has got the information that flight recorder ULDs compliant with ETSO-C121b will be commercially available towards the end of 2014, and that 8.8 kHz ULDs compliant with ETSO-C200 will be commercially available in the first half of 2016. These timeframes provide for sufficient time to apply the requirements related to ULDs proposed by NPA 2013-26.</p>

comment	<p>11 comment by: <i>Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)</i></p> <p>The Swedish Transport Agency (CAA Sweden) fully supports the proposal in NPA 2013-26</p>
response	<p>Noted. The Agency thanks you for this comment.</p>
comment	<p>22 comment by: <i>Swiss International Airlines / Bruno Pfister</i></p> <p>Swiss International Air Lines support the NPA and has following comments to offer: GENERAL</p> <p>1. Installation of recorders with longer recording capability is fully supported for the following reasons:</p> <ul style="list-style-type: none"> <li>· Getting rid of obsolete and unreliable recording techniques</li> <li>· Improved duration of CVR recordings</li> <li>· Improved transmission time of Underwater Location Devices (ULDs)</li> <li>· Improved detection range of ULDs.</li> </ul> <p>2. It is our understanding (as in other industries) that communication is a private and confidential matter and needs to be protected unless there is good reason to deviate from this principle. As the CVR will always record private communication as well, in order to preserve the privacy of the crew members involved, there must be <b>clear and very conservative regulations/agreements with the authorities under which circumstances CVR data may be analyzed.</b> Particular, because the new recording capabilities will include previous flights (without incidents) as well.</p> <p>3. A new regulation has to clearly stipulate under which circumstances the flight crew has to preserve the CVR recording (by pulling the CBs). This includes possible legal aspects that need to be clarified.</p> <p>SPECIFIC</p> <p>Quick Access Recorders must be made available also for CVR which is crucial not to disrupt operations and for mere cost reasons: 'CAT.GEN.MPA.195 Preservation, production and use of flight recorder recordings Following an accident or an <b>incident that is subject to mandatory reporting</b>, the operator of an aircraft shall preserve the original recorded data for a period of 60 days unless otherwise directed by the investigating authority.'</p> <p>Incidents "subject to mandatory reporting" according to today's and upcoming regulations are much higher in number than the current „Accidents, Serious Incidents und Incidents investigated by the Investigation Authority" (at LX an estimated 10 per month). If after every such incident the CVR has to be put in quarantine, this would lead to high cost and flight cancellations on outstations (recorders are MEL items). <b>Therefore, a Quick Access Option also for CVR must be available from the introduction of such regulation</b></p>
response	<p>1. Noted. The Agency thanks you for this comment. 2. Partially accepted.</p> <p>Rules to protect the CVR recordings are already in place in air operation rules: refer to Annex IV to Commission Regulation (EU) No 965/2012 (air operations rules applicable to commercial air transport), CAT.GEN.MPA.195(f). Such provisions are not new, as they also exist in paragraph OPS 1.160 (subparagraph c) of the Annex to Commission Regulation (EC) 859/2008 (EU OPS).</p> <p>However, in order to prevent abusive use of very long duration CVRs by</p>

aircraft operators, provisions have been added to CAT.GEN.MPA.195(f): see reply to comment 68.

3. Not accepted. For privacy protection reasons, the use of a CVR is to be reserved for the safety investigation authority, therefore, EUROCAE Document 112A specifies for the CVR that:

'The means for replaying the recording shall:

- a. require the removal of the recorder from its location in the aircraft,
- b. minimise the possibility of unauthorised replay of the recording'.

For this reason, a quick access is not considered to be appropriate.

However, in order to address the problem that there can be many more incidents subject to mandatory reporting than incidents subject to a safety investigation, NPA 2013-26 proposed that paragraph (a) of CAT.GEN.MPA.195 is modified as such:

'(a) Following an accident or a serious incident, or if directed by the investigating authority, the operator of an aircraft shall preserve the original recorded data...'

In NPA 2013-26 it was also proposed to clarify the principles to be followed by the aircraft commander with regards to the preservation of flight recorders recordings, in subparagraph (a)(10) of paragraph CAT.GEN.MPA.105 of Part-CAT.

comment 34

comment by: *Bombardier Aerospace*

Bombardier Aerospace has no technical comment on the proposed modifications to flight recorder requirements and supports the withdrawal of obsolete recorder technologies. However, we lament the lack of international harmonization in this area. FAA, EASA, TCCA and other regulatory agencies develop new national requirements based on recommendations from accident investigations. As an international manufacturer, Bombardier must design to the most restrictive available standard to ensure the compliance of its aircraft in all markets.

While Bombardier supports the regular update of flight recorder standards, this piecemeal approach of individual regulators results in new recorder requirements every few years. This in turn requires the certification of new flight recorder installations, at considerable expense. Were a harmonized approach to be used with more substantial requirement upgrades occurring at greater intervals, the end result would be similar. These results would however be achieved with fewer (but more extensive) modification programs for the recorder installations.

Ideally, these standards would be driven by ICAO Annex 6 and allow regulators to use an established international standard. However, we recognize the 2-hour CVR recording standard in Annex 6 is significantly exceeded by the proposed 15-hour requirement of the NPA.

response

Not accepted.

The Agency is always striving to harmonise European aviation safety regulations with the Standards and Recommended Practices (SARPs) of ICAO and with the regulations of counterparts. Most proposals made by NPA 2013-26 are actually aligning European air operation rules with SARPs that were recently incorporated in ICAO Annex 6, as indicated in the Executive Summary of NPA 2013-26, and detailed in each Regulatory Impact Assessment.

However, according to Regulation (EC) No 216/2008 of the European Parliament and of the Council establishing the Agency, Article 2 (1), 'The principal objective

of this Regulation is to establish and maintain a high uniform level of civil aviation safety in Europe'. The harmonisation with ICAO SARPs is one of the additional objectives stated by Article 2(2), yet the principal objective set to the Agency remains the safety of civil aviation in Europe. This is the reason why the Agency may elect, on some topics, more stringent requirements than ICAO SARPs.

In addition NPA 2013-26 is only proposing changes to European air operation rules. Therefore, European aircraft operators are considered the main cost contributors for the implementation of these changes. In addition, for all the equipment that is proposed to be mandated by NPA 2013-26 (90-days ULDs, 8.8 kHz ULDs, 15-hours recording duration CVRs), international industry standards are published. For example, EUROCAE Document 112A identifies several classes of CVRs, including the 15 hours recording duration CVR (refer to paragraph I-1.3.2 of EUROCAE Document 112A).

comment 39 comment by: *Luftfahrt-Bundesamt*

The LBA has no comments on NPA 2013-26.

response Noted. The Agency thanks you for this comment.

comment 59 comment by: *Austro Control*

We take note of the safety concerns expressed in the different RIAs and Opinions as well as with the safety recommendations. In addition to that we would like to receive more information why the NPA deviates in the CVR requirements from the existing ICAO SARPs and how this difference will be addressed to ICAO taking into account the currently planned closer co-ordination in rulemaking activities on both sides (EASA and ICAO).

response Noted.  
According to Regulation (EC) No 216/2008 of the European Parliament and of the Council establishing the Agency, Article 2(1), 'The principal objective of this Regulation is to establish and maintain a high uniform level of civil aviation safety in Europe'. The harmonisation with ICAO SARPs is one of the additional objectives stated by Article 2(2), yet the principal objective set to the Agency remains the safety of civil aviation in Europe.  
This is the reason why the Agency may elect, on some topics, more stringent requirements than ICAO SARPs. Given the numerous safety recommendations and findings made by European safety investigation authorities, it was decided to propose the introduction of a CVR with a recording duration of 15 hours for large commercial air transport aeroplanes manufactured after 2019. A detailed justification of this choice can be found in Regulatory Impact Assessment B of NPA 2013-26.

Note 1:

Contracting States must, in accordance with Article 38 of the Chicago Convention, notify ICAO when their regulation differs from an ICAO Standard. However a State is free to adopt any additional requirements to the provisions of ICAO Annexes that is compliant the Chicago Convention of 1944.

It should be noted that in any case, when an EU rule is considered higher or more demanding than an ICAO standard, it is not considered as a difference falling under Article 38.

Note 2:

The Agency is represented in ICAO Flight Recorder Panel and coordination with



ICAO in the domain of flight recorders is ensured.

comment 61

comment by: Airbus Operations GmbH

**General Comment: Consistency of AMCs**

Following AMCs are included in the Annex to ED Decision 2012/018/R (Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Part-CAT):

Quote

AMC1 CAT.IDE.A.185 Cockpit voice recorder (OPERATIONAL PERFORMANCE REQUIREMENTS)) contains:

(b) For aeroplanes first issued with an individual CofA on or after 1 January 2016, the operational performance requirements for CVRs should be those laid down in EUROCAE Document ED-112 (...).

AMC1 CAT.IDE.A.190 Flight data recorder

OPERATIONAL PERFORMANCE REQUIREMENTS FOR AEROPLANES FIRST ISSUED WITH AN INDIVIDUAL CofA ON OR AFTER 1 JANUARY 2016

(c) The parameters to be recorded should meet the performance specifications (range, sampling intervals, accuracy limits and resolution in read-out) as defined in the relevant tables of EUROCAE Document ED-112 (..).

Unquote

During the assessment of change impacts to implement provisions to comply with CAT.IDE.A.185 and CAT.IDE.A.190, AIRBUS identified two problems with the AMCs mentioned above. The aircraft architecture interfacing with the CVRS and DFDRS was specified based on ED55 and ED56A. The ED112 was not available at time when Single Aisle (A320 family) and A330/340 were designed. AIRBUS identified for instance that a change of the AMU[1] would be necessary if ED112 would be applied. However, the current design (based on ED56A) is appropriate to deliver required quality input for the CVR[2]. An improvement with respect to safety cannot be determined. AIRBUS is reluctant to launch a design change on the AMU, which is costly, but without having an effective improvement.

Similarly, the source systems delivering recording parameters to the DFDRS are designed to comply with ED55[3]. Therefore, the specification of such source systems were established in line with the ranges, sampling intervals, accuracy limits and resolutions as listed in ED55. There are characteristic of some parameters, e.g. accuracy limits, which do not match with the values given by ED112. Closing such gaps would lead to a significant change on respective source system, because the required characteristic is not readily available by existing design.

AIRBUS does not identify an issue to maintain the existing design source systems and to record the specific parameters by the best achievable specification with respect to accuracy and resolution[4].

Consequently, AIRBUS request EASA to adapt the two affected AMCs by adding following sentences (new text underlined):

**AMC1 CAT.IDE.A.185 Cockpit voice recorder**

(b) For aeroplanes first issued with an individual CofA on or after 1 January 2016, the operational performance requirements for CVRs should be those laid down in EUROCAE Document ED-112 (Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems) dated March 2003, including amendments n°1 and n°2, or any later equivalent standard produced by EUROCAE. For all aircraft the EUROCAE ED56A (Minimum Operational Performance Requirements For Cockpit Voice Recorder Systems) dated December 1993 should be applicable for the interface definition of aircraft systems delivering audio signal inputs. For aircraft with an initial TC later March 2003 the EUROCAE ED112 is applicable for the interface definition of aircraft systems delivering audio signal inputs.

**AMC1 CAT.IDE.A.190 Flight data recorder**

OPERATIONAL PERFORMANCE REQUIREMENTS FOR AEROPLANES FIRST ISSUED WITH AN INDIVIDUAL CofA ON OR AFTER 1 JANUARY 2016

(a)..

(b)..

(c) The parameters to be recorded should meet the performance specifications (range, sampling intervals, accuracy limits and resolution in read-out) as defined in the relevant tables of EUROCAE Document ED-112, including amendments n°1 and n°2, or any later equivalent standard produced by EUROCAE. The parameters should meet the performance specifications of EUROCAE Document ED-55 (Minimum Operational Performance Requirements for Flight Data Recorder Systems, dated May 1990), which will be provided from system sources of aircraft, which type design was certified before ED112 became available.

[1] Audio Management Unit (provides audio inputs for the CVR)

[2] AIRBUS introduced already changes required to align different volume levels, which are outputs of the AMU. The results of those changes were found acceptable by French BEA, who assessed the CVR recording quality.

[3] Referenced as AMC by EU-OPS.1

[4] Such exceptional cases were discussed with FAA. They agreed with AIRBUS approach, and changed accordingly Part 121 Appendix M (see footnoted, e.g. 2,3,4,..).

response

Not accepted.

This comment is requiring changes to AMC paragraphs which are not modified by NPA 2013-26.

EUROCAE Document 112 (ED-112) was published in March 2003. This industry standard is internationally recognised and it is referred to by ETSOs C123b, C124b and C177, which were published in December 2010.

According to paragraph AMC1 CAT.IDE.A.185 and CAT.IDE.A.190 of Executive Director (ED) Decision 2012/018/R published in October 2012, the performance specified by ED-112 will be applicable to CVRs and FDRs installed on aircraft first issued with an individual Certificate of Airworthiness on or after 1 January 2016.

This means that ED-112 specifications will apply to flight recorders installed on aircraft manufactured almost 13 years after ED-112 publication and more than 3 years after the publication of ED Decision 2012/018/R.

Aircraft manufacturers have sufficient time to incorporate the specifications given by ED-112 by 1 January 2016.

comment

63

comment by: *DGAC France*

DGAC France supports the general objectives of this NPA.  
For detailed comments see paragraphs below.

response

Noted. The Agency thanks you for this comment.

comment

65

comment by: *European Cockpit Association*

ECA has serious concerns with regard to the proposed increased cockpit voice recorder recording duration.

The Regulatory Impact Assessment B, as described in NPA 2013-26, seriously underestimates the social impact that a 15 hour CVR will have on flight crews.

	<p>At the same time the safety benefits of the increased recording time are rated inconsistently and biased towards an arbitrary choice of 15 hours. Although increasing the CVR recording time may help to some extent the investigation process, such an increase creates at the same time a disproportionate impact on the privacy of flight crews and is rather costly for the airlines to implement. <b>Therefore ECA strongly recommends the proposed increase to 15 hrs to be withdrawn.</b></p> <p><b>CVR data has been prematurely and repeatedly released</b> and been subject to public/media debate, generally with little relation to the context of the accident. ECA therefore believes that as long as the current safeguards are not adequately enforced and additional safeguards in place, 15-hour CVR recordings have an even bigger potential for misuse. It would have a <b>negative effect on our current safety systems</b> which are based on trust in the application of <b>Just Culture</b> principles, and might put undue pressure on and negatively affect the independence of the investigation.</p> <p>It should be also stressed that the proposed measure results from an <b>'Agency task'</b>. It therefore did not involve any technical consultation during the NPA drafting, does not involve a review group and therefore <b>did not benefit from adequate input from</b> relevant stakeholders, such as <b>AIBs, national aviation authorities and industry experts</b> like professional pilots and airlines.</p> <p>Finally, the proposed measure is <b>not in line with the European Flight Recorder Partnership Group's (EFRPG) recommendation</b>, which insisted on a number of prerequisites to be fulfilled <i>before</i> an extension of the CVR recording time could be envisaged. To date, these prerequisites are not fulfilled. Given that it was an Agency task, the EFRPG views are even more important to be taken into account as it was the only channel for EASA to benefit from the expertise of stakeholders.</p>
response	<p>Not accepted.</p> <p>The potential social impact and the potential economic impact of the introduction of a 15 hours recording duration are addressed in detail in sections 5.3 and 5.4 of Regulatory Impact Assessment (RIA) B of NPA 2013-26.</p> <p>Regrettably, the release of CVR recordings by some judicial authorities has not impeded the work of safety investigation authorities in Europe which have rights and powers now enshrined in Regulation (EU) No 996/2010. Among the 7 safety recommendations mentioned in paragraph 1.1.2 of RIA B, 4 recommendations are requesting that the minimum recording duration of the CVR be extended beyond 2 hours (safety recommendations GREC-2006-045, NETH-2011-015, FRAN-2012-025 and FINL-2012-003).</p> <p>There already are provisions in place in air operation rules that restrict the possible use of the CVR recording (refer Annex IV of Commission Regulation (EU) No 965/2012 (Part-CAT), paragraph CAT.GEN.MPA.195), and the Agency is not aware of abusive use of the CVR by EASA Member States' aircraft operators. Nevertheless, the Agency has reinforced the existing requirements to prevent any drift with the introduction of very long duration CVRs: see reply to comment 68.</p> <p>The RIA B of NPA 2013-26 relies on the analysis and conclusions of the document titled 'Very long recording duration Cockpit Voice Recorder' produced by the European Flight Recorder Partnership Group (EFRPG). The EFRPG is a group of flight recorder experts in which safety investigation authorities, national aviation authorities, aircraft operators, aircraft manufacturers and pilot associations are represented.</p>

The EFRPG document titled 'Very long recording duration Cockpit Voice Recorder' recommends, among other, the following:

- '1. The European air operation rules should be modified in order to:  
(...)  
b. require that newly manufactured aeroplanes of a MCTOM over 27 000 kg that are required to carry a CVR be equipped with a CVR of recording duration of no less than 15 hours and no more than 20 hours. It is advised to give a notice of at least three years from the time of requirement publication, and to apply this new requirement to aircraft first issued with an individual certificate of airworthiness from a date (to be determined) posterior to 01 January 2016.'

This EFRPG document makes other recommendations (related to advance arrangements between safety investigation authorities and judicial authorities, and to the definition of penalties for disclosing illegally CVR recordings), however, this EFRPG document does not state that those are pre-requisites to the introduction of very long-recording duration CVRs.

## EXECUTIVE SUMMARY

p. 1

comment	41	comment by: FAA
	The term "over water" needs clarification. Specifically, "...after an accident over water..." would seem to not account for a PIC homicide/suicide, for example, or for damage to the aircraft only upon impact with the water. Recommend you define "over water" to include on-water events, intentional (e.g., seaplane during takeoff run), or other.	
response	Partially Accepted.	
	While addressing security issues is not in the remit of the Agency, the means to locate a missing aircraft should, in order to be fully effective, also address the case of a malevolent act, i.e. they should not be easily disabled during the flight. The ULDs are stand-alone beacons and they cannot be disabled during the flight. In addition, the expression 'following an accident' has been changed in subparagraph (f) of paragraph CAT.IDE.A.285, since not all of the cases of accidents encompassed by the definitions of ICAO Annex 13 and Regulation (EU) No 996/2010 are relevant for the automatic means to determine the end of the flight within 6 NM accuracy. However, it is considered that the term 'flight over water' used for the title of paragraph CAT.IDE.A.285 is clear and, therefore, does not need to be changed. The term 'over-water flights' is also in use in ICAO Annex 6 Part I (e.g. refer to paragraph 6.5.3)	

## 2. Explanatory Note — 2.3. Overview of the proposals and impacts

p. 9-12

comment	7	comment by: Honeywell
	<p><b>15 Hour CVR</b></p> <p>- "... From 1 January 2019, the CVR installed on board an aeroplane shall not record on magnetic tape or magnetic wire, and it shall be capable of retaining the data recorded during at least:</p> <p>- (1) the preceding 15 hours for aeroplanes with an MCTOM of more than</p>	

**27 000 kg and first issued with an individual CofA on or after 1 January 2019;****NPA references**

2.3.1 , 2.4.3(a)(3), 2.4.5(a), 2.5,

- ♦ CAT.IDE.A.185 – (c)(1)
- ♦ CAT.IDE.A.160 – (b)(1)
- ♦ SPO.IDE.A.140 – (b)(1)

**Comments**

- ♦ Conducting CVR audio serviceability checks of all 15 hours of recording places an undue burden on the operator.

**Rationale:**

To conduct an audio intelligibility check of 4 channel CVR each recording 15 hours would cost (15x4 = 60 hours per recorder) at \$100/hour = \$6,000 compared to (4x2 x100 = \$800. This is a financial burden on operators.

**Recommendation:**

- ♦ Audio intelligibility should be conducted on the most recent 2 hours of recording, to be equivalent to the more common 2 hour solid state CVRs
- 2.3.1 The definition of what constitutes an “over-water flight” and what is not, is confusing. Requirements need to stipulate based on size of the aircraft, since flying over the Mediterranean, Black Sea, Arabian gulf, are standard routes for twin aisles and narrow-body aircraft.
- In only 1 case reported, would a 2-Hour SSCVR not have recorded the entire flight up to and including the accident - that flight is Helios 522, 14 Aug 2005, due to de-pressurization. All other examples cited were incidents.
- For new a/c range is being extended to 20+ hour flight legs. As an example, the original intent of the 25 Hour Flight Data Recorder was to capture all data from the current flight, and the prior to takeoffs and landings (and in the “old” days, it was assumed a maximum flight time would be 8 hours (8x3 = 24 (close to 25). Today, with 15+ hour flight legs possible, the same logic would lead one to need 50 hours of flight data on the FDR.
- If the intent is to capture all incidents, then a Quick Access CVR (QACVR) or a Lightweight recorder per TSO C-197 with a 25 hour minimum recording standard (or even longer) is a much more cost effective solution, enabling installation in the cockpit/cabin, with minimal DO-160 requirements, etc. It appears from the NPA text that such an option was not considered. Honeywell suggest EASA review the CAAC requirements in China for such a device that they are in the process of mandating.

- **Reference examples cited in NPA, Annex C: reported cases of CVR overrun and Table B.C.1, B.C.2, and B.C.3.**

response

- Comment on the inspection of the CVR recording: not accepted.

Subparagraph (b) of paragraph GM1 CAT.GEN.MPA.195(b) of the Annex to Executive Director Decision 2012/018/R states:

‘(b) The inspection of the CVR recording usually consists of:

(1) checking that the CVR operates correctly for the nominal duration of the recording;

(2) examining, where practicable and subject to prior approval by the flight crew, a sample of in-flight recording of the CVR for evidence that the signal is acceptable on each channel; and

(3) preparing and retaining an inspection report.’

The check (b)(1) does not require listening to 60 hours, just that the recording duration is equal to or longer than the minimum recording duration required. The check (b)(2) is to be conducted on ‘a sample of in-flight recording’. Hence the

recording duration of the CVR should have little influence on the duration and cost of the CVR recording inspection.

- Comment on 2.3.1. Not accepted.

Paragraph 2.3.1 presents only a summary of preferred options. The proposed amendment of paragraph CAT.IDE.A.285 does not mandate a 8.8 kHz for 'over-water flights' but in the case where 'The aeroplane is operated over routes on which it is at no point at a distance of more than 180 NM from the shore' (see 3.1.1).

- Comment on the examples of CVR overruns with 2-hours recording duration CVRs: not accepted.

The table B.C.1 and B.C.2 in Annex C to RIA B displays 23 occurrences which are either accidents or serious incidents. A serious incident is 'an incident involving circumstances indicating that there was a high probability of an accident' (refer to ICAO Annex 13 and to Regulation (EU) No 996/2010), it is not just an incident. All serious incidents occurring over the territory of an EASA Member State require an official safety investigation according to Regulation (EU) No 996/2010.

- Comment on the recording duration of the CVR: not accepted.

The recording duration of 15 hours proposed by NPA 2013-26 was not meant to capture several flights but primarily to record in its entirety a long-range flight and to make the CVR more immune to inappropriate actions by the flight crew or maintenance personnel after a short-range flight: see paragraph 5.1.4 of Regulatory Impact Assessment B of NPA 2013-26.

- Comment on the idea of a Quick Access CVR: not accepted.

The use of a CVR is reserved for authorities, except if all crew members concerned consent (refer to Annex to Commission Regulation No 859/2008 (EU OPS), paragraph OPS 1.160, and to Annex IV to Commission Regulation (EU) No 965/2012 (Part-CAT), paragraph CAT.GEN.MPA.195). A non-protected audio recorder or a TSO-C197 compliant Cockpit Audio Recording System is not an adequate solution for a large aeroplane, because it is not designed to survive the conditions of an accident with a large aeroplane. Therefore, it could not be a substitute for a crash-protected CVR for investigation purpose.

comment 35

comment by: *General Aviation Manufacturers Association / Hennig*

The General Aviation Manufacturers Association (GAMA) remains concerned about the perpetual change in recording requirements including Flight Data Recorders (FDR) and Cockpit Voice Recorder (CVR) equipment. The content of Notice of Proposed Amendment (NPA) 2013-26 was discussed at recent Safety Standards Consultative Committee (SSCC) meetings at which time the EASA presented Information Paper 4 (see, EASA R/TAG/1-2012/07, Information Paper 04, 08-09-2012) which identifies a minimum of seven pending amendments to recording equipment. These changes include RMT.0400/0401, RMT.0249, RMT.0271/0272, RMT.0308/0309, RMT.0265, RMT.0283/0284, and RMT.0294/0295.

These perpetual changes to the recording equipment requirements impose ever increasing costs on aircraft manufacturers and operators while providing ever diminishing safety returns.

GAMA recommends that EASA take every step to ensure that the agency remains harmonized with ICAO Annex 6 Parts I, II, and III requirements to avoid dis-

	harmonisation between recording equipment requirements in Europe and the rest of the world.
response	Not accepted.  See reply to comment 34. In addition, while RMT.0249, RMT.0271/0272, RMT.0308/0309 are all related to flight recorders, their scope is different. RMT.0265, RMT.0283/0284, and RMT.0294/0295 are not in the Rulemaking Programme 2014/2017.
comment	48 <span style="float: right;">comment by: FAA</span>  "Mandate that from 1 January 2019, the CVR fitting an aeroplane operated for commercial air transport has a minimum recording duration of 2 hours and is not recording on magnetic tape or magnetic wire..." The FAA added this requirement to regulations in 2005. Adoption of this NPA would standardize EASA and FAA rules.
response	Noted. The Agency thanks you for this comment.
comment	49 <span style="float: right;">comment by: FAA</span>  "Mandate that from 1 January 2019, the CVR fitting an helicopter operated for commercial air transport is not recording on magnetic tape or magnetic wire..." Also adopted by the FAA in 2005. Adoption of this NPA will standardize EASA and FAA rules.
response	Noted. The Agency thanks you for this comment.
comment	52 <span style="float: right;">comment by: FAA</span>  "Mandate that aeroplanes operated for commercial air transport with an MCTOM of over 27 000 kg and first issued with an individual CofA on or after 1 January 2019 be equipped with a CVR that has a minimum recording duration of 15 hours..." The FAA has not adopted a similar regulation, and has no immediate plans to do so. We do not believe we could justify the expense of mandating very long-duration CVRs in fleets of aircraft that do not have flight durations approaching the recording duration of the CVR. 15 hours also seems somewhat arbitrary since there are aircraft and routes of longer duration than 15 hours; thus, on the majority of aircraft in CAT service there would be a contentious excess of recording, while on the minority of aircraft flying the longest routes there would still be insufficient capacity to record the entire flight.
response	Noted. See the reply to comment 37 for a summary of the reasons that led to proposing a 15-hours recording duration. However, it is accepted that a somewhat longer recording duration would make the CVR able to capture completely the last flight in all cases, which is a better solution on the long term. Therefore, the 15-hours recording duration requirement has been replaced by a 20-hours recording duration requirement in CAT.IDE.A.185, NCC.IDE.A.160 and SPO.IDE.A.140.
comment	53 <span style="float: right;">comment by: FAA</span>  "Mandate that the ULDs of all crash-protected flight recorders have a transmission time of 90 days by 1 January 2020..." The FAA cancelled the TSO for the 30 day

	<p>ULB batteries and issued a new TSO for 90 day batteries. This will ensure that all 30 day ULBs are replaced by 90 day ULBs within the next 6 years, effectively accomplishing the same as the EASA proposal.</p>
response	<p>Noted.</p> <p>The withdrawals of Technical Standard Order (TSO) authorisations according to FAA TSO-C121 and TSO-C121a by 1 March 2015 will result into flight recorder ULDs manufactured after this date being compliant with TSO C-121b. However, with this measure it will take roughly the service life of a ULD to get 30-day ULDs replaced by 90-day ULDs on all flight recorders. ULDs have service life of 20 years or even longer. Depending on the model, they are not systematically replaced at the service time of the ULD battery.</p> <p>Hence the withdrawals of TSO authorisations corresponding to FAA TSO-C121 and TSO-C121a is not considered equivalent to a mandatory replacement of all flight recorder ULDs by ETSO-C121b compliant ULDs before 1 January 2020.</p>
comment	<p>55 <span style="float: right;">comment by: FAA</span></p> <p>" Mandate that large aeroplanes are equipped by 1 January 2019 with an 8.8 kHz ULD when they:  · are operated for commercial air transport and performing long-range over-water flights,  · were first issued with an individual CofA on or after 1 January 2005, and  · <b>are not equipped with a reliable means to determine, in case of an accident, the location of the impact point with the Earth surface within 6 NM accuracy.</b>"</p> <p>The FAA continues to support the industry and international regulatory authorities in the development of technologies that would better support the location of wreckage in remote or overwater accidents. The focus of these activities are not based on a specific technology, but rather on establishing the desired result for crash location and allowing the industry to be creative and develop appropriate technology to accomplish that task.</p>
response	<p>Noted.  The Agency has taken note of the FAA position on this issue.</p>
comment	<p>85 <span style="float: right;">comment by: CAA NL</span></p> <p>General comments on RIA B.</p> <p>In Option 3, the mandatory recording time for the CVR will be increased to 15 hours for new aircraft first issued an individual CofA after 1 January 2019. We assume that this limit has a relation with the current longest flight duration. This recording time would create the possibility to save the CVR recordings of the complete flight for all possible flights now. However when the necessity exists to save these recordings after a flight at an outpost where there is no possibility to read the CVR in a controlled manner with all the necessary precaution, or the possibility for a quick change of recorders, this creates the risk of the next flight, or in the event of a freighter the next series of flights before returning to home base have to be executed without a working CVR. This is a undesirable situation.</p> <p>As this proposal is only related to new aircraft and new equipment starting in 2019, it would probably not change much in the cost equations to make the recording time even longer. It would even be more cost effective if when changing these rules to make a big step once and not to change now to cater for the situation of one complete flight and then maybe within a number of years advance</p>



to the series of flight between home base and home base. Data recording in itself is very cheap nowadays, and adding additional recording time will only increase the costs marginally.

The Netherlands would like to propose to change option 3 into a more performance based rule, to increase the recording time into the period long enough to record the (series of) flights between home base or two bases where a possibility exists to preserve the data of the previous flight(s) related to the investigation of accidents, or incidents subject to mandatory reporting, without leaving the aircraft without functional CVR for the next flight(s).

This suggestion will have consequences for those amended rules in CAT.IDE.A.185, NCC.IDE.A.160 and SPO.IDE.A.140. We suggest the following text for CAT, for other parts, similar text could be used:

CAT.IDE.A.185

(c) From 1 January 2019, the CVR installed on board an aeroplane shall not record on a magnetic tape or a magnetic wire, and it shall be capable of retaining the data recorded during at least:

(1) for aeroplanes with an MCTOM of more than 27 000 kg and first issued with an individual CofA on or after 1 January 2019 all flight between the stop at a base where the CVR data can be preserved without leaving the aircraft without a functioning CVR for the next flight; or

(2) the preceding 2 hours for aeroplanes with an MCTOM of up to 27 000 kg or that were first issued with an individual CofA before 1 January 2019.

Further additional changes could be needed to the related TSO's, and we would suggest to the agency to consider whether the limit of MCTOM of 27.000 kg could be lowered to 5700 kg to include Business jets and air taxi who could also fly series of flights to places without the possibilities of adequate data preservation.

Off course with a longer recording time the current precautions for the appropriate use of these data are getting of more importance as more data not related to the accident or incident is available. It would be advisable for the agency to include these aspects in their adaption of their standardisation program related to the implementation of SMS and Just Culture.

response

Not accepted.

According to ICAO Annex 13, Chapter 5:

'5.1.2 The State of Occurrence shall institute an investigation into the circumstances of a serious incident when the aircraft has a maximum mass of over 2 250 kg.'

And

'5.16 When an aircraft involved in an accident or a serious incident lands in a State other than the State of Occurrence, the State of Registry or the State of the Operator shall, on request from the State conducting the investigation, furnish the latter State with the flight recorder records and, if necessary, the associated flight recorders.'

Hence, according to ICAO Annex 13 Standards, the State of Occurrence of a serious incident is usually responsible for its investigation. In any case, the State conducting the investigation decides if the CVR recording should be preserved. Whatever the recording duration of the CVR, the aircraft should not fly away with the CVR without prior authorisation by the State conducting the safety investigation.

This is the intent of subparagraph (a) of CAT.GEN.MPA.195 as modified by NPA 2013-26.

'(a) Following an accident or a serious incident, or if directed by the investigating authority, the operator of an aircraft shall preserve the original recorded data for

a period of 60 days or until otherwise directed by the investigating authority.'

## 2. Explanatory Note — 2.4. Overview of the proposed amendments

p. 13-19

comment	<p>1 comment by: <i>Association of Dutch Aviation Technicians NVLT</i></p> <p>2.4.1.(2) To the point of view of the NVLT: "Deactivation or reactivation of a aircraft system by means of resetting or pulling circuit breakers is a maintenance procedure (M) activity and should only be handled by properly authorized maintenance personnel such as 'certifying staff and or a commander with a limited certification authorization. The definition of 'maintenance' in Commission Regulation (EC) No 2042/2003 is perfectly clear and should be obeyed at all times. 'Instructions and means to deactivate the flight recorders immediately after completion of the flight and inform others that the flight recorder recordings shall be preserved,' should be mentioned in the Master Minimum Equipment List (MMEL). These instructions and means should be qualified as a 'maintenance procedure' (M) in the MMEL. Any justification of a deactivation of an aircraft system should be mentioned in the aircraft technical log (ATL) by properly authorizes maintenance personnel. This emphasizes that any reactivation of an aircraft system should also be justified in the ATL by properly authorizes maintenance personnel. The NVLT suggest that EASA should issue a Safety Information Bulletin, by means of SIB No.: 2009-07, Issued: 27 March 2009, Subject: Resetting Tripped Circuit Breakers.</p>
response	<p>Not accepted. The aircraft operator is primarily responsible for preserving the recordings of flight recorders for a period of 60 days, as indicated by subparagraph (a) of paragraph CAT.GEN.MPA.195 of Part-CAT (Annex IV to Commission Regulation (EU) No 965/2012). In addition, the aircraft commander is responsible for taking the first measures to preserve the recordings of the flight recorders, as indicated by subparagraph (a)(10) of paragraph CAT.GEN.MPA.105. It is up to the aircraft operator to define the appropriate procedures for the flight crew members and for passing the information to the maintenance staff. For this, the aircraft operator must coordinate with its maintenance staff and/or the maintenance organisations it has contracted. Therefore, the new provisions proposed by NPA 2013-26 related to flight recorder preservation (refer to paragraph 2.4.1) are considered sufficient, and no update of Safety Information Bulletin 2009-07 is planned. As stated in paragraph CS MMEL.110 of the Annex to Executive Director Decision 2014/004/R (Certification Specifications and Guidance Material for Master Minimum Equipment List, CS-MMEL): 'The MMEL is a document that lists the items which may be temporarily inoperative, associated with special operating conditions, limitations or procedures, as applicable, for a specific aircraft type or model.' Hence the purpose of the MMEL is only to specify under which conditions an aircraft may be operated when a given item is inoperative (be it due to a failure of the item or to an intentional disabling of the equipment). Its purpose is not to specify how to deactivate a system.</p>
comment	<p>6 comment by: <i>Honeywell</i></p>

**Alleviation of performing recording inspections from once every year to every 2 years****NPA references :**

- 2.4.2(a)(1) states the intention of serviceability tasks as “..monitoring should apply to the flight recorder system, that is to say the flight recorder, its dedicated sensors and the dedicated acquisition equipment .”
- 2.4.2 (a)(3); (a)(5); (a)(7); 2.4.2 (e)(3); (i)(3)
- ♦ AMC1.CAT.GEN.MPA.195(b) – (a)(2); (a)(3); (a)(4)
- ♦ AMC1.NCC.GEN.145(b) (a)(2)
- ♦ AMC1.SPO.GEN.145(b)(b) – (a)(2)

**Comments:**

Reducing the frequency of crash recording inspections from once per year to once per 2 years for solid state crash recorders will mask (hide) the validation of the actual data values recorded in crash memory.

**Rationale:**

The purpose of the annual download is data validation for FDR and audio intelligibility for CVR is verification of the aircraft external sensors and processing systems. Using the QAR data for FOQA Program is not a validation of the data recorded in crash protected memory. The recorder internal BITE is a function of the ability of the recorder to receive, process and store incoming data. It does not validate the aircraft system components external to the recorder itself – sensor sources, data busses, data processing or transmission to the recorder. Similarly using the Press To Test for CVR does not provide indication that the microphone is working and/or quality of audio recorded.

**Recommendation**

Honeywell recommends to retain the current 1 year frequency of data validation inspection

response

Not accepted.

The relaxing of the time interval between recording inspections to 2 years is limited to flight recorders which are solid-state and fitted with continuous monitoring. This is because for such a type of flight recorder, it is assumed that problems with the quality of the recording are mainly due to the quality of data provided to the flight recorder, and that the flight recorder itself is reliable and capable of timely reporting internal failures. In addition, it has been proposed in NPA 2013-26 to add a provision in AMC1 CAT.GEN.MPA.195(b) recommending that oral or visual means for pre-flight checking the flight recorder status should, when installed in the cockpit, be checked every day (if such means is not available, then an operational check of the flight recorder should be conducted at time intervals not exceeding 7 days). This is to ensure that the proper operation of the flight recorder is effectively checked at regular intervals.

For magnetic tape flight recorders, the time interval between recording inspections remains 1 year because of their lower reliability and the fact that they don't have an effective self-monitoring function. A time interval of 1 year is consistent with the recommendations of former national guidance documents such as CAP 731 published by the Civil Aviation Authority of United Kingdom, which were meant for magnetic tape flight recorders (refer to Regulatory Impact Assessment A of NPA 2013-26).

comment

23

comment by: UK CAA

**Page No: 13**

	<p><b>Paragraph No:</b> 2.4.1</p> <p><b>Comment:</b> The CAA fully supports the changes to the operations manual and preservation of flight recorder recordings. Indeed, the UK CAA made similar such proposals following concerns raised by operators confused by the current text.</p>
response	Noted. The Agency thanks you for this comment.
comment	<p>36                                      comment by: <i>General Aviation Manufacturers Association / Hennig</i></p> <p>The NPA proposes that from January 1, 2019 an aeroplane operated for commercial air transport has a CVR with a minimum recording duration of 2 hours.</p> <p>GAMA notes that some manufacturers have voluntarily taken steps to install CVR equipment on aircraft outside the scope of the requirements of operational equipment requirements. Manufacturers have taken a voluntary step to equip aircraft with this capability and it would be inappropriate for the agency to require costly retrofitting for those operators and manufacturers who have taken a proactive step to provide a CVR capability on the aircraft. If the agency mandated retrofit of equipment that has been voluntarily installed on aircraft by a manufacturer (or operator) it would dissuade future voluntary equipage decisions by the aviation community.</p> <p>GAMA recommends that EASA, through guidance material to the amendment, clarify that only those CVRs that are installed for the purpose of meeting a regulatory requirement must be upgraded to the more stringent requirements of having the longer recording capability of 2 hours.</p>
response	<p>Partially accepted.</p> <p>This concern is understood, and the wording of CAT.IDE.A.185(c) has been clarified by removing the terms 'installed on board an aeroplane':</p> <p>'(c) From 1 January 2019, the CVR shall not record on a magnetic tape or a magnetic wire, and it shall be capable of retaining the data recorded during at least:...'</p> <p>However, no GM paragraph has been added, as it is obvious that the requirements on the CVR recording only apply to those aeroplanes which are required to carry a CVR and identified in CAT.IDE.A.185(a). As a general principle for all air operation provisions, requirements on a given equipment only apply when carriage of this equipment is required, and not when it is installed on a voluntary basis.</p>
comment	<p>37                                      comment by: <i>General Aviation Manufacturers Association / Hennig</i></p> <p>The NPA proposes that aeroplanes with an MCTOM of over 27,000kg and first issued with a Certificate of Airworthiness issued on or after January 1, 2019 be equipped with a CVR that has a minimum recording duration of 15 hours.</p> <p>GAMA notes that there are a number of aeroplanes of this size that cannot operate flights of 15 hours in length, but typically have operational capability much shorter. Additionally, many aeroplanes of this size typically conduct flight operations that are less than 1-2 hours in length.</p> <p>GAMA recommends that EASA provide discretion for manufacturers, especially for models that are already in production, to continue to install CVR with minimum recording durations of less than 15 hours if the aircraft has a range that is significantly less than the 15 hours. While this would be a difference from ICAO, GAMA believes this would facilitate a cost-effective change to CVR requirements for the aggregate fleet.</p>

response

Not accepted.

The extension of the recording duration of the CVR beyond 2 hours for future large aeroplanes is specifically motivated by 4 safety recommendations addressed to the Agency (safety recommendations GREC-2006-045, NETH-2011-015, FRAN-2012-025 and FINL-2012-003) and numerous findings made by safety investigation authorities. It has three objectives:

1. Adapt the recording duration of the CVR to the needs of investigating serious incidents. With the entry into force of Regulation (EU) No 996/2010 in 2010, the investigation of serious incidents has become an obligation for safety investigation authorities of all EU Member States. Because there are around 4 times more serious incidents than accidents in Europe, the flight recorders cannot anymore be only tailored to the investigation of accidents. The majority of cases of CVR overruns were found during the investigation of a serious incident, because after a serious incident the aircraft is still capable of flying and there is usually no need for an emergency landing. In that case, the flight is continued as planned and the recording of the serious incident by the CVR is usually overwritten.
2. Take into account these accidents where a recording duration of 2 hours is not sufficient, because either:
  - the cumulated durations to handle malfunctions, descending, dumping fuel, landing and managing the cabin evacuation exceed two hours (e.g. A380 registered VH-OQA and operated by Qantas); or
  - the aircraft is flying on its own after the occurrence, because of flight crew loss or flight crew incapacitation (e.g. B737 registered 5B-DBY and operated by Helios Airways).
3. Make the CVR more immune to inappropriate actions by the flight crew or maintenance personnel after the flight. Frequently, the CVR is found to have overrun because it was not properly deactivated upon completion of the flight by the flight crew or it was unintentionally reactivated by the maintenance staff (the lack of specific operational procedures being a common contributing factor to this case). With a recording duration much higher than 2 hours, the recording of the occurrence could be overwritten only if the CVR was kept running for several hours after completion of the flight, which is unlikely.

(see also paragraphs 1.1.1, 1.1.2 and 5.1.4 of RIA B of NPA 2013-26).

Prescribing a CVR recording duration which is dependent on the aircraft endurance would lead to introduce more CVR variants and deprive aircraft operators of the flexibility to install the same equipment on different aircraft types. It would also add unnecessary complexity to flight recorder requirements.

Therefore, it was considered that a unique recording duration value should be elected, as it is the case for the 2-hours recording duration CVR or the 25-hours recording duration FDR.

The European Flight Recorder Partnership Group established in 2013 (after a survey of equipment manufacturers) that a CVR compliant with ED-112 specifications and with a recording duration in the range from 15 to 20 hours is achievable with the technology of 2013.

Half of the cases of CVR overrun with 2-hours recording duration CVRs that are presented in tables B.C.2 and B.C.3 of RIA B of NPA 2013-26 occurred with aeroplane models which have a maximum flight endurance of less than 7 hours. An extension of the CVR recording duration to 15 hours or more would be as much beneficial for short-range and medium-range large aeroplanes as for long-range aeroplanes. On the other hand, flights with a duration of 15 hours or more

are seldom. When considering aeroplanes with an MCTOM of over 27 000 kg and registered in an EASA Member State: less than 5 % are of a model which has an endurance of more than 15 hours. And only a fraction of the flights performed today by these aeroplanes are actually longer than 15 hours. Therefore, a recording duration of 15 hours was elected by NPA 2013-26.

In addition, the sensors and the flight deck controls for a very long recording duration CVR do not need to be different from the sensors and the flight deck controls for a 2-hours recording duration CVR. EUROCAE Document 112A has introduced a class of CVRs with a recording duration of 15 hours, but apart from the recording duration, the specifications for this new class of CVR is exactly the same as for a 2-hours recording duration CVR. Therefore, no significant certification cost is expected to arise from the installation of a very long recording duration CVR on future aeroplanes of an already certified type.

comment	42	comment by: FAA
	It is unclear if "commander" and "pilot-in-command" are meant to be synonyms. If so, pick one throughout. If not, define each and distinguish use in context.	
response	Not accepted. As indicated in the definitions for terms in use in other parts, including Part ORO, Part-CAT, Part-NCC and Part-SPO (Annex I to Commission Regulation (EU) No 965/2012): "pilot-in-command" means the pilot designated as being in command and charged with the safe conduct of the flight. For the purpose of commercial air transport operations, the 'pilot-in-command' shall be termed the 'commander';" Hence the term 'commander' is used in Part-CAT, while in Part-NCC and Part-SPO, the equivalent term 'pilot-in-command' is used.	

**Draft Opinion – 3.1.1.Amendments to Annex IV (Part CAT – Commercial air transport operations) – SUBPART A – GENERAL REQUIREMENTS**

p. 20

comment	79	comment by: European Cockpit Association
	Attachment <a href="#">#1</a>	
	Please find attached a document presenting all ECA's proposed changes regarding the NPA regulatory sections, from § 3.1.1. to § 3.2.4.	
response	Noted. The changes proposed by the document attached by ECA were also subject to comments 65, 67, 68, 70, 71, 72, 73 made by ECA. These comments were replied.	

**Draft Opinion – 3.1.1.Amendments to Annex IV (Part CAT – Commercial air transport operations) – SUBPART D – INSTRUMENTS, DATA, EQUIPMENT – Section 1 - Aeroplanes**

p. 21-22

comment	16	comment by: Embraer - Indústria Brasileira de Aeronáutica - S.A.
	<b>Comment:</b> Minimum recording duration hours, for the CVR, should be expressed in terms of	

maximum flight time hours, instead of a fixed number of hours.

**Reason(s) for Comment:**

The functionality of a recorder is to collect accurate data to assist investigations of accidents and incidents. Therefore, the recording duration of the CVR should be long enough to cover the entirety of a flight cycle, which is a completed take-off and landing sequence. For the majority of the world's aircraft fleet, a typical flight cycle will be significantly inferior to 15 hours.

Additionally, CAT.GEN.MPA.105(a)(10)(ii)(A) determines that the commander is responsible for ensuring that the flight recorders "(ii) in the event of an accident or an incident that is subject to mandatory reporting (A) are not intentionally erased". Thus, recording data for longer than the actual flight time might not even be useful for evaluating the course of the previous flight, since there is no requirement that prohibits erasing the data after the completion of an uneventful flight.

Therefore, a 15 hour recording capacity is a lot more than what is actually useful for the most aircraft.

**Proposed Change/Text (where applicable):**

The text passage:

*"(c) From 1 January 2019, the CVR installed on board an aeroplane shall not record on a magnetic tape or a magnetic wire, and it shall be capable of retaining the data recorded during at least:*

*(1) the preceding 15 hours for aeroplanes with an MCTOM of more than 27000 kg and first issued with an individual CofA on or after 1 January 2019; or (...)"*

should be changed to:

*"(c) From 1 January 2019, the CVR installed on board an aeroplane shall not record on a magnetic tape or a magnetic wire, and it shall be capable of retaining the data recorded during at least:*

*(1) the duration of the longest possible flight achievable with the particular model of airplane, limited at 15 hours, for aeroplanes with an MCTOM of more than 27000 kg and first issued with an individual CofA on or after 1 January 2019; or (...)"*

response Not accepted.

With regards to the choice of a recording duration of 15 hours, see reply to comment 37.

With regards to erasure of CVR data, indeed the European air operation rules requires preservation of the CVR recording only in the case of an occurrence subject to an official safety investigation, and the flight crew is entitled to run the CVR bulk erase function after completion of an uneventful flight. However, new solid-state models that are compliant with EUROCAE Document (ED) 112 or ED-112A are such designed that the bulk erase function does not remove the recorded data, but only modify the CVR recording so that 'it cannot be retrieved using any and all normal replay or copying techniques' (refer to ED-112 paragraph I-2.1.7). Special techniques available to the recorder manufacturers and/or accident investigation authorities for dealing with severely damaged recorders can still be used to retrieve the data.

comment 19

comment by: *Embraer - Indústria Brasileira de Aeronáutica - S.A.*

**Comment:**

The NPA establishes several performance standards for voice recorders, but the applicability of those requirements for airplanes that are voluntarily equipped with a CVR is not clear.

**Reason(s) for Comment:**

Some airplanes are equipped voluntarily with a CVR, without being required by the regulations. However, as the NPA establishes higher standards for CVR performance, it should be made clear that those only apply to airplanes that are required to equip them. If this distinction is not made, it might encourage manufacturers to remove the CVR from airplanes that had voluntarily equipped a CVR that does not meet all of the new requirements.

As an example, a similar situation was handled adequately for the data link recording requirement: it is only required for airplanes that are required to be equipped with a CVR, instead of for all airplanes that are equipped with it.

**Proposed Change/Text (where applicable):**

Add the following paragraph:

*"CAT.IDE.A.185 Cockpit voice recorder*

*(h) The requirements in (b) to (g) do not apply to a CVR installed in an airplane other than those specified in (a)."*

response

Partially accepted.

See reply to comment 36.

comment

38

comment by: *Qantas Airways Avionics Engineering*

Given the numerous occurrences as noted in this NPA of extended search periods for missing aircraft and the associated cost to the global economic community, I would suggest the following text for CAT.IDE.A.285 Flight Over Water, paragraph (f):

(f) From 1 January 2019, aeroplanes with an MCTOM of more than 27 000 kg and first issued with an individual CofA on or after 1 January 2005, unless the aeroplane is operated over routes on which it is at no point at a distance of more than 180 NM from the shore, shall:

(1) be fitted with two securely attached underwater locating devices that operate at a frequency of 8.8 kHz  $\pm$  1 kHz, one in the front one third of the fuselage and one in the rear one third of the fuselage, and

(2) be equipped with an automatic means to determine, following an accident, the location of the point of impact with the Earth's surface within 6 NM accuracy.

This means shall not be able to be deactivated intentionally whilst the aeroplane is in flight or its engines are operating,

Commentary:

(1) (E)TSO-C200 devices are not a significant cost or weight penalty for aircraft and would be easily installed, and

(2) by 1 January 2019 most if not all aeroplanes which operate more than 180nm from the shore would be equipped with satellite communications equipment, and

(3) powering such equipment from circuit breakers which are not easily accessible in flight would not be difficult to achieve

Based on these points, I believe the above proposed text for CAT.IDE.A.285 Flight Over Water, paragraph (f) would be realistic and acceptable to the aviation community and the general travelling public, particularly in view of recent events.

response

Partially accepted.



While addressing security issues is not in the remit of the Agency, it is agreed that the proposals related to localisation of a missing aircraft should also cover the case of a security event and corresponding means should not be easily disabled by a flight crew member. The ULDs are stand-alone equipment and they cannot be disabled during the flight. Therefore, AMC2 CAT.IDE.A.285(f) has been modified to recommend that the alternative means for locating the accident within 6 NM accuracy does not offer any control to disable it during the flight.

However, there is no justification for mandating the installation of 2 long detection range ULDs instead of 01 on large aeroplanes. Please note that this type of ULD is not meant to be attached to a flight recorder, but directly to the aircraft.

In addition, all the technological options currently identified by experts to determine, following an accident, the location of the end of flight within 6 NM accuracy, would be costly if they were retrofitted to legacy aircraft. Indeed, to be effective, any option would have to fulfil the criteria enumerated in the paragraph AMC2 CAT.GEN.MPA.195(f) proposed by NPA 2013-26, which could not be achieved without a Major Change to the aircraft type of the retrofitted aircraft.

comment

50

comment by: Airbus Operations GmbH

**Airbus Comment on Para CAT.IDE.A.185(c):**

AIRBUS is interested in implementing design changes required to achieve operational compliance based on globally harmonised regulations. The proposed amendments, which require a 15h-CVR (CAT.IDE.A.185(c), NCC.IDE.A.160(b)(1), and SPO.IDE.A.140(b)(1)) do not fulfil this criteria.

For instance, the FAA has introduced just 4 years ago operational requirements to install 2 hours CVRs on all commercial airplanes (FAR 121.359(j)). According to their near term and medium planning, there is no anticipation of changing this rule.

ICAO/ANC reviewed proposals of Accident Investigation Agencies to require longer duration of CVRs to avoid overrun after an accident or a serious incident. But, there is still a discussion on determining the most suitable extension of recording time, the effective date, when such a recorder should be part of aviation regulations, and to which types of aircraft an extended CVR should be requested. According to current discussion status, ICAO will come up with a final Recommended Practice (SARP[1] of Annex 6 amendment) in 2015/16. It is assumed that such a SARP will propose an effectivity date in 2020 for new manufactured A/C or only for new Type of Aircraft (initial TC on or after 1.1.2020).

If FAA will not change their regulations, and if ICAO will request a different target date compared to European-OPS, than the situation for European operators will be unbalanced, because only they would be required operating the 15 hours-CVR. In the case of non-harmonisation, aircraft manufactures are obliged to maintain at least two production lines[2] with respect to 2h-and the 15h-CVR. Two sets of operational/maintenance manuals must be maintained. This would lead to significant higher costs compared to a situation, where a regulatory switch from 2-hours to 15-hours will be synchronised globally.

AIRBUS did not evaluate the industrial and market availability of CVRs capable of 15 hours. Even if development of such CVRs seems to be possible, not all questions are clear concerning the approval of such new recorder, e.g. qualification requirements of applicable TSOs are not established today. That is one of the reasons why AIRBUS is unable to justify the cost assumptions made by EASA.

AIRBUS finds some of the root cause mentioned in the NPA 2013-26 not completely comprehensive. EASA refers to frequent cases of the cockpit voice recorder overwriting the recording after an accident or a serious incident (also called 'CVR overrun'), making the CVR useless for the safety investigation. On the other hand, the overwrite situation on short-range aircraft and long-range aircraft is not comparable. The risk of overwriting of useful information is much lower on short-range aircraft (e.g. AIRBUS Single Aisle types). Here, the 15hours CVR seems to be over-specified. This is one of the concerns why ICAO/ANC is still reviewing the issue. Their goal is to find a good balance with a new requirement considering most effective ways to improve safety objectives.

[1] Standards And Recommended Practices

[2] For one aircraft type there is often a standard vendor and a second optional vendor for CVRs. This multi-vendor option is offered to fulfil customers' request, which have a favoured standard (e.g. L3Com or Honeywell).

**Airbus Proposal:**

**AIRBUS proposes to postpone the NPA on CAT.IDE.A.185(c), NCC.IDE.A.160(b)(1), and SPO.IDE.A.140(b)(1) until ICAO based consensus will be established (future amendment of ICAO annex 6). A consultation with FAA is recommended in order to harmonise such an important rule change between the two major aviation authorities.**

response

Not accepted.

With regard to harmonisation with ICAO Standards and Recommended Practices, see the reply to comment 34.

With regard to the choice of a unique recording duration of 15 hours for all large aeroplanes, see the reply to comment 37.

comment

56

comment by: *Airbus Operations GmbH*

**AIRBUS Comment on Para CAT.IDE.A.285(f):**

AIRBUS identifies following issues concerning rulemaking related to localising accident sites (Point of impact with the earth's surface):

EASA NPA CAT.IDE.A.285(f) requires a localisation means for only "flight over-water" operations. AMC 2 and GM1 of CAT.IDE.A.285(f) are not clear at this point, because both refer to "Point of impacts with the earth's surface". The examples of possible solutions<sup>[1]</sup>, EASA mentioned within AMC2 and GM1 can be considered as means which would comply with requirements for both over-water, and with uncontrolled airspace operation.

The NPA CAT.IDE.A.285(f) covers mainly the ICAO Annex 6, chapter 6.5.3.c[2], however, there are ongoing discussions (ICAO/ANC), which may result in a request that also **operating in any uncontrolled airspace** (not only "over water") shall provide means to localise an accident site by 6nm accuracy<sup>[3]</sup>.

Before making a decision on an implementation, following criteria shall be considered in order to develop the most effective solution:

1. 1. Will requirements (issued by EASA, and ICAO), include localisation means for uncontrolled airspace (general earth's surface), in addition to the flight over-water operations?
2. 2. Will such requirements be applicable for forward-fit (manufacturing) A/C only (as it is proposed by ICAO/FLIREC), or will retrofit be required (as NPA 26-2013 CAT.IDE.A.285(f) asking CofA 1.Jan 2005)?
3. 3. When the requirement should be effective (2018 refer to ICAO Annex 6, chapter 6.5.3. or 2019 EASA NPA)?

In case ICAO or EASA will issue additional requirements, which includes localisation on earth' surface (land and water), then a low-frequency ULD (as mentioned in CAT.IDE.A.285(f)) would not be usable alone as means of compliance, another additional means must be installed. On the other hand, all of the alternative solutions, mentioned by AMC2 and GM1, are potential candidates suitable for both, "over water" and as well "land" localisation.

ICAO did not issue the associated SARP so far, therefore AIRBUS would recommend postponing the NPA CAT.IDE.A.285(f) and associated AMC/GM. Currently AIRBUS is not able to estimate matured availabilities of the several technologies, which are mentioned as candidates to allow compliance with the proposed regulation. Although some equipment would be available in coming time, e.g. the low-frequent ULD, their industrialisation is still unclear. For others, no estimate can be made with respect to the time, when they would be available. An effective date of the rule, earlier than suitable technologies will become mature would preclude these technologies. This would be disadvantageous, in case such technologies would otherwise perfectly serve as means for the 6nm localisation.

AIRBUS expects results of the studies mentioned above by 2016. AIRBUS proposes to provide EASA information on the results then, which may help to select the most effective solution.

There are also other options that will be studied concerning their usability as possible means to comply with a 6nm localisation requirement. For instance, the Next Generation of automatic ELTs (NG-ELT) may overcome the weakness of current ELT technology. EUROCAE WG-48 and RTCA SC 229 have just been launched, with support of EASA and FAA. One objective of these WGs will be to determine the suitability of the NG-ELT compliance means with the 6nm rule. If successful, the NG-ELT would match with the GM1 CAT.IDE.A.285(f)), (c)(2). But currently, it is too early to justify this point.

AIRBUS wants to select the right technology, which would comply optimally with any near and medium term effective regulations, assuming that regulations for operation in uncontrolled areas will become valid.

Most of the mentioned technologies are part of current research & technology studies. Of course, costs for installation/operations are an important factor. The cost factor would increase significantly, if retrofit would become part of the new regulation, independent of whatever solution would be selected.

The costs to introduce low frequency ULD may be considered as being moderate. However this solution would limit the effectiveness (no immediate S&R support, no direct localisation data), which are part of other solutions. Disadvantageous is that an ULD is useful for a case, when the wreckage is below circa 3000m under water<sup>[4]</sup> and for detection of longer distance. In case of an accident on any earth' surface (land) the ULD cannot work.

Furthermore the retrofit requirement would preclude some of the possible solutions (e.g. deployable ELT/recorder). This technology would only be designed for new design aircraft, because of reasonable costs calculations. Basically, AIRBUS did not consider so far retrofit scenario for any of the technology studies mentioned above. Retrofit of the ULD is technically feasible, but is still a significant cost factor for operators. AIRBUS proposed to select a suitable way to include only more modern aircraft, and to exclude older aircraft types (e.g. A300/A310).

#### **AIRBUS Proposals:**

- 1. 1. AIRBUS proposes postponing the NPA CAT.IDE.A.285(f) until a harmonised decision will be available based on an ICAO Annex 6 SARP. In addition, a harmonisation with other AA, e.g. FAA is highly recommended.**
- 2. 2. AIRBUS proposes that Retrofit should be excluded, mainly because additional installation/operations costs are an important factor compared to solutions for forward fit design.**

response

[1] AMC 2 CAT.IDE.A.285(f): Periodic transmission and Triggered transmission of aircraft position data; Automatic deployable flight recorder/ELT.

[2] Applicable for aeroplanes on long-range over water flights.

[3] Refer to ..... Accident Investigation Agencies advised within FLIREC that localization of wreckage site and recorders is not only over-water accident is an issue, but a general issue.

[4] Up to this range, the "normal" Recorder attached ULBs are detectable (1800 to 3600 meters), dependent on the sea state, nearby boats, marine animals, gas or oil lines, and other factors contributing to the ambient noise level will affect the range at which the beacon can be detected.

Not accepted.

The issue addressed by Regulatory Impact Assessment (RIA) D of NPA 2013-26 is finding the aircraft wreckage after an accident over an oceanic area, for investigation purposes.

Most of oceanic areas are out of range of ATM surveillance means, so that in the event of an accident in such an area, its location may be unknown or very inaccurate, and as a result the search area is very large, resulting in the search operations being very long and costly for the State conducting the investigation. In addition, as illustrated by the accident of the A330 registered F-GZCP (Air France flight 447) and of the B777 registered 9M-MRO (Malaysia Airlines flight 370), even military surveillance means are not helpful for locating quickly accidents in oceanic areas. On the contrary, accidents of large aeroplanes (over 27 000 kg MCTOM) over land have almost always been quickly located. Therefore, retrofitting large aeroplanes that fly over oceanic areas with very long detection range ULDs is considered an adequate solution for investigation needs.

With regards to feasibility and cost, an industry standard (SAE AS6254) exist for this piece of equipment, which is referred to by TSO-C200 and ETSO-C200. The cost of retrofitting is moderate (in the range of 2 400 to 4 500 EUR per each individual aircraft: refer to RIA D of NPA 2013-26), and there is no significant implementation issue. Models of ETSO-C200 compliant ULDs are expected to be commercially available in large quantities in the first half of 2016.

Concerning rules harmonisation, this new requirement will bring EASA Member States in compliance with Standard 6.5.3.1(c) of ICAO Annex 6. This Standard is requiring that the following be installed on aeroplanes with an MCTOM of over 27 000 kg performing long-range over-water flights:

'a securely attached underwater locating device operating at a frequency of 8.8 kHz.'

However, NPA 2013-26 has also offered an alternate possibility to a very long detection range ULD, which is an automatic means to determine, following an accident, the location of the end of flight within 6 NM accuracy. Indeed, with such an automatic pre-localisation means, the search area would be small enough and 90-days flight recorders ULDs would be sufficient help to locate the wreckage and the flight recorders.

Hence, with the requirements proposed by NPA 2013-26 the aircraft operators are free to opt either for a very long detection range ULD or for any technological solution that allows locating the aircraft within 6 NM in case of an accident.

Note:

In the expression 'with the Earth's surface' as it appears in NPA 2013-26, 'Earth' with a capital 'E' is used, because 'the planet Earth' is meant here. This is why AMC2 CAT.IDE.A.285(f) recommends that the automatic means for locating the accident within 6 NM accuracy should 'work at most locations on Earth, including oceanic areas and remote land areas'.

comment 64

comment by: Boeing

Page: 22

Paragraph: Section 3.1.1, CAT.IDE.A.285, paragraph (f)

**The proposed text states:***"CAT.IDE.A.285 Flight over water**(...)*

*(f) From 1 January 2019, aeroplanes with an MCTOM of more than 27 000 kg and first issued with an individual CofA on or after 1 January 2005 shall be fitted with a securely attached underwater locating device that operates at a frequency of 8.8 kHz ± 1 kHz, unless:*

*(1) The aeroplane is operated over routes on which it is at no point at a distance of more than 180 NM from the shore; or*

*(2) The aeroplane is equipped with an automatic means to determine, following an accident, the location of the point of impact with the Earth's surface within 6 NM accuracy."*

**REQUESTED CHANGE:** Do not implement this requirement until:

- it has been coordinated internationally,
- compliant equipment has been developed and certified, and
- an accurate cost-benefit analysis has been performed.

**JUSTIFICATION:** Historically, rule changes concerning flight recorders have been incremental and not coordinated across international regulatory bodies. Repeated changes to equipment and airplanes have been required by various regulations that, consequently, have imposed considerable costs on the industry. Boeing requests that EASA's proposed amendments first be coordinated with ICAO and other regulatory agencies for harmonization. Equipment will need to be developed and certified, possibly several times depending on unique regulations, to be compliant; this drives significant cost for the airframe manufacturer and suppliers. Along with that, significant cost will be levied on operators to meet the retrofit requirement(s). All of this should be accounted for prior to implementing this proposed requirement.

response Not accepted.

See reply to comment 56.

**INSTRUMENTS, DATA AND EQUIPMENT – Section 1 – Aeroplanes**

comment	<p>17 comment by: <i>Embraer - Indústria Brasileira de Aeronáutica - S.A.</i></p> <p><b>Comment:</b> Minimum recording duration hours, for the CVR, should be expressed in terms of typical flight cycle hours, instead of a fixed number of hours.</p> <p><b>Reason(s) for Comment:</b> The functionality of a recorder is to collect accurate data to assist investigations of accidents and incidents. Therefore, the recording duration of the CVR should be long enough to cover the entirety of a flight cycle, which is a completed take-off and landing sequence. For the majority of the world's aircraft fleet, a typical flight cycle will be significantly inferior to 15 hours. Additionally, NCC.GEN.106(a)(9)(ii)(A) determines that the commander is responsible for ensuring that the flight recorders "(ii) in the event of an accident or an incident that is subject to mandatory reporting (A) are not intentionally erased". Thus, recording data for longer than the actual flight time might not even be useful for evaluating the course of the previous flight, since there is no requirement that prohibits erasing the data after the completion of an uneventful flight. Therefore, a 15 hour recording capacity is a lot more than what is actually useful for the most aircraft.</p> <p><b>Proposed Change/Text (where applicable):</b> The text passage: <i>"(b) The CVR shall be capable of retaining data recorded during at least the preceding 2 hours: (1) the preceding 15 hours for aeroplanes with an MCTOM of more than 27000 kg and first issued with an individual CofA on or after 1 January 2019; or (...)"</i></p> <p>should be changed to: <i>"(b) The CVR shall be capable of retaining data recorded during at least the preceding 2 hours: (1) the duration of the longest possible flight achievable with the particular model of airplane, limited at 15 hours, for aeroplanes with an MCTOM of more than 27000 kg and first issued with an individual CofA on or after 1 January 2019; or (...)"</i></p>
response	<p>Not accepted.</p> <p>See reply to comment 16.</p>
comment	<p>20 comment by: <i>Embraer - Indústria Brasileira de Aeronáutica - S.A.</i></p> <p><b>Comment:</b> The NPA establishes several performance standards for voice recorders, but the applicability of those requirements for airplanes that are voluntarily equipped with a CVR is not clear.</p> <p><b>Reason(s) for Comment:</b> Some airplanes are equipped voluntarily with a CVR, without being required by the regulations. However, as the NPA establishes higher standards for CVR performance, it should be made clear that those only apply to airplanes that are required to equip them. If this distinction is not made, it might encourage</p>

manufacturers to remove the CVR from airplanes that had voluntarily equipped a CVR that does not meet all of the new requirements.  
As an example, a similar situation was handled adequately for the data link recording requirement: it is only required for airplanes that are required to be equipped with a CVR, instead of for all airplanes that are equipped with it.

**Proposed Change/Text (where applicable):**

Add the following paragraph:

"NCC.IDE.A.160 Cockpit voice recorder

(g) The requirements in (b) to (f) do not apply to a CVR installed in an airplane other than those specified in (a)."

response

Partially accepted.

See reply to comment 36.

comment

54

comment by: Airbus Operations GmbH

**Airbus Comment on Para NCC.IDE.A.160(b)(1)**

AIRBUS is interested in implementing design changes required to achieve operational compliance based on globally harmonised regulations. The proposed amendments, which require a 15h-CVR (CAT.IDE.A.185(c), NCC.IDE.A.160(b)(1), and SPO.IDE.A.140(b)(1)) do not fulfil this criteria.

For instance, the FAA has introduced just 4 years ago operational requirements to install 2 hours CVRs on all commercial airplanes (FAR 121.359(j)). According to their near term and medium planning, there is no anticipation of changing this rule.

ICAO/ANC reviewed proposals of Accident Investigation Agencies to require longer duration of CVRs to avoid overrun after an accident or a serious incident. But, there is still a discussion on determining the most suitable extension of recording time, the effective date, when such a recorder should be part of aviation regulations, and to which types of aircraft an extended CVR should be requested. According to current discussion status, ICAO will come up with a final Recommended Practice (SARP[1] of Annex 6 amendment) in 2015/16. It is assumed that such a SARP will propose an effectivity date in 2020 for new manufactured A/C or only for new Type of Aircraft (initial TC on or after 1.1.2020).

If FAA will not change their regulations, and if ICAO will request a different target date compared to European-OPS, than the situation for European operators will be unbalanced, because only they would be required operating the 15 hours-CVR. In the case of non-harmonisation, aircraft manufactures are obliged to maintain at least two production lines[2] with respect to 2h-and the 15h-CVR. Two sets of operational/maintenance manuals must be maintained. This would lead to significant higher costs compared to a situation, where a regulatory switch from 2-hours to 15-hours will be synchronised globally.

AIRBUS did not evaluate the industrial and market availability of CVRs capable of 15 hours. Even if development of such CVRs seems to be possible, not all questions are clear concerning the approval of such new recorder, e.g. qualification requirements of applicable TSOs are not established today. That is one of the reasons why AIRBUS is unable to justify the cost assumptions made by EASA.

AIRBUS finds some of the root cause mentioned in the NPA 2013-26 not completely comprehensive. EASA refers to frequent cases of the cockpit voice recorder overwriting the recording after an accident or a serious incident (also called 'CVR overrun'), making the CVR useless for the safety investigation. On the

other hand, the overwrite situation on short-range aircraft and long-range aircraft is not comparable. The risk of overwriting of useful information is much lower on short-range aircraft (e.g. AIRBUS Single Aisle types). Here, the 15hours CVR seems to be over-specified. This is one of the concerns why ICAO/ANC is still reviewing the issue. Their goal is to find a good balance with a new requirement considering most effective ways to improve safety objectives.

**Airbus Proposal:**

**AIRBUS proposes to postpone the NPA on CAT.IDE.A.185(c), NCC.IDE.A.160(b)(1), and SPO.IDE.A.140(b)(1) until ICAO based consensus will be established (future amendment of ICAO annex 6). A consultation with FAA is recommended in order to harmonise such an important rule change between the two major aviation authorities.**

response Not accepted.

With regards to harmonisation with ICAO Standards and Recommended Practices, see the reply to comment 34.

With regards to the choice of a unique recording duration of 15 hours for all large aeroplanes, see the reply to comment 37.

**Draft Opinion – 3.1.3 Amendments to Annex VIII (Part SPO – Specialised operations) – SUBPART D – INSTRUMENTS, DATA AND EQUIPMENT – Section 1 – Aeroplanes** p. 25-26

comment 18

comment by: *Embraer - Indústria Brasileira de Aeronáutica - S.A.*

**Comment:**

Minimum recording duration hours, for the CVR, should be expressed in terms of typical flight cycle hours, instead of a fixed number of hours.

**Reason(s) for Comment:**

The functionality of a recorder is to collect accurate data to assist investigations of accidents and incidents. Therefore, the recording duration of the CVR should be long enough to cover the entirety of a flight cycle, which is a completed take-off and landing sequence. For the majority of the world's aircraft fleet, a typical flight cycle will be significantly inferior to 15 hours.

Additionally, SPO.GEN.107(a)(9)(ii)(A) determines that the commander is responsible for ensuring that the flight recorders "(ii) in the event of an accident or an incident that is subject to mandatory reporting (A) are not intentionally erased". Thus, recording data for longer than the actual flight time might not even be useful for evaluating the course of the previous flight, since there is no requirement that prohibits erasing the data after the completion of an uneventful flight.

Therefore, a 15 hour recording capacity is a lot more than what is actually useful for the most aircraft.

**Proposed Change/Text (where applicable):**

The text passage:

"(b) The CVR shall be capable of retaining data recorded during at least ~~the preceding 2 hours~~:

(1) the preceding 15 hours for aeroplanes with an MCTOM of more than 27000 kg and first issued with an individual CofA on or after 1 January 2019; or (...)"

should be changed to:

"(b) The CVR shall be capable of retaining data recorded during at least ~~the~~



	<p><i>preceding 2 hours:</i>  <i>(1) the duration of the longest possible flight achievable with the particular model of airplane, limited at 15 hours, for aeroplanes with an MCTOM of more than 27000 kg and first issued with an individual CofA on or after 1 January 2019; or (...)"</i></p>
response	<p>Not accepted.</p> <p>See reply to comment 16.</p>
comment	<p>43 <span style="float: right;">comment by: FAA</span></p> <p>It is unclear if "commander" and "pilot-in-command" are meant to be synonyms. If so, pick one throughout. If not, define each and distinguish use in context.</p>
response	<p>Not accepted.</p> <p>See reply to comment 42.</p>
comment	<p>51 <span style="float: right;">comment by: Airbus Operations GmbH</span></p> <p><b><u>Airbus Comment on Para SPO.IDE.A.140(b)(1)</u></b>  AIRBUS is interested in implementing design changes required to achieve operational compliance based on <u>globally harmonised regulations</u>. The proposed amendments, which require a 15h-CVR (CAT.IDE.A.185(c), NCC.IDE.A.160(b)(1), and SPO.IDE.A.140(b)(1)) do not fulfil this criteria.  For instance, the FAA has introduced just 4 years ago operational requirements to install 2 hours CVRs on all commercial airplanes (FAR 121.359(j)). According to their near term and medium planning, there is no anticipation of changing this rule.  ICAO/ANC reviewed proposals of Accident Investigation Agencies to require longer duration of CVRs to avoid overrun after an accident or a serious incident. But, there is still a discussion on determining the most suitable extension of recording time, the effective date, when such a recorder should be part of aviation regulations, and to which types of aircraft an extended CVR should be requested. According to current discussion status, ICAO will come up with a final Recommended Practice (SARP[1] of Annex 6 amendment) in 2015/16. It is assumed that such a SARP will propose an effectivity date in 2020 for new manufactured A/C or only for new Type of Aircraft (initial TC on or after 1.1.2020).  If FAA will not change their regulations, and if ICAO will request a different target date compared to European-OPS, than the situation for European operators will be unbalanced, because only they would be required operating the 15 hours-CVR. In the case of non-harmonisation, aircraft manufactures are obliged to maintain at least two production lines[2] with respect to 2h-and the 15h-CVR. Two sets of operational/maintenance manuals must be maintained. This would lead to significant higher costs compared to a situation, where a regulatory switch from 2-hours to 15-hours will be synchronised globally.  AIRBUS did not evaluate the industrial and market availability of CVRs capable of 15 hours. Even if development of such CVRs seems to be possible, not all questions are clear concerning the approval of such new recorder, e.g. qualification requirements of applicable TSOs are not established today. That is one of the reasons why AIRBUS is unable to justify the cost assumptions made by EASA.  AIRBUS finds some of the root cause mentioned in the NPA 2013-26 not</p>

completely comprehensive. EASA refers to frequent cases of the cockpit voice recorder overwriting the recording after an accident or a serious incident (also called 'CVR overrun'), making the CVR useless for the safety investigation. On the other hand, the overwrite situation on short-range aircraft and long-range aircraft is not comparable. The risk of overwriting of useful information is much lower on short-range aircraft (e.g. AIRBUS Single Aisle types). Here, the 15hours CVR seems to be over-specified. This is one of the concerns why ICAO/ANC is still reviewing the issue. Their goal is to find a good balance with a new requirement considering most effective ways to improve safety objectives.

**Airbus Proposal:**

**AIRBUS proposes to postpone the NPA on CAT.IDE.A.185(c), NCC.IDE.A.160(b)(1), and SPO.IDE.A.140(b)(1) until ICAO based consensus will be established (future amendment of ICAO annex 6). A consultation with FAA is recommended in order to harmonise such an important rule change between the two major aviation authorities.**

response Not accepted.

With regards to harmonisation with ICAO Standards and Recommended Practices, see the reply to comment 34.  
With regards to the choice of a unique recording duration of 15 hours for all large aeroplanes, see the reply to comment 37.

**Draft Decision — 3.2.1 Amendment of AMC/GM to Annex III (Part ORO Organisation requirements)**

p. 26-28

comment 4

comment by: DGAC France

AMC2 ORO.MLR.100 concerning the content of the operations manual for NCC operators has been amended to include amendments of procedures regarding the preservation of recordings.

No amended text is currently foreseen for AMC4 ORO.MLR.100  
Yet, for consistency, the future AMC4 ORO.MLR.100 concerning SPO operations, whether commercial or non-commercial with CMPA, should be amended the same way as AMC2 ORO.MLR.100

response Accepted.

Following the publication of Commission Regulation (EU) No 379/2014, the Agency published ED Decision 2014/017/R containing the amended AMC and GM to Part-ORO, including the content of AMC4 ORO.MLR.100. A draft amendment of this paragraph has been included in the CRD draft text. It is mostly an alignment with the draft amendment to AMC3 ORO.MLR.100 related to the preservation of flight recorders recordings.

comment 44

comment by: FAA

It is unclear if "commander" and "pilot-in-command" are meant to be synonyms. If so, pick one throughout. If not, define each and distinguish use in context.

response Not accepted.

See reply to comment 42.

**Draft Decision – 3.2.2 Amendment of AMC/GM to Annex IV (Part CAT – Commercial air transport operations) – Subpart A – General requirements**

p. 29-32

comment	<p>2 <span style="float: right;">comment by: <i>Association of Dutch Aviation Technicians NVLT</i></span></p> <p>2.4.1.(2)          To the point of view of the NVLT:          "Deactivation or reactivation of a aircraft system by means of resetting or pulling circuit breakers is a maintenance procedure (M) activity and should only be handled by properly authorized maintenance personnel such as 'certifying staff and or a commander with a limited certification authorization.          The definition of 'maintenance' in Commission Regulation (EC) No 2042/2003 is perfectly clear and should be obeyed at all times.          'Instructions and means to deactivate the flight recorders immediately after completion of the flight and inform others that the flight recorder recordings shall be preserved,' should be mentioned in the the Master Minimum Equipment List (MMEL). These instructions and means should be qualified as a 'maintenance procedure' (M) in the MMEL.          Any justification of a deactivation of an aircraft system should be mentioned in the aircraft technical log (ATL) by properly authorizes maintenance personnel. This emphasizes that any reactivation of an aircraft system should also be justified in the ATL by properly authorizes maintenance personnel.          The NVLT suggest that EASA should issue a Safety Information Bulletin, by means of SIB No.: 2009-07, Issued: 27 March 2009, Subject: Resetting Tripped Circuit Breakers.</p>
response	<p>Not accepted.</p> <p>See reply to comment 1.</p>
comment	<p>21 <span style="float: right;">comment by: <i>Dassault Aviation</i></span></p> <p>Dassault-Aviation comment on chapters  <b>AMC1 CAT.GEN.MPA.195(b) page #30 ; AMC1 NCC.GEN.145(b) page #36 ; AMC1 SPO.GEN.145(b) page #40; § (c)</b>          ...          (c) When installed, the aural or visual means for pre-flight checking the flight recorders for proper operation should be used every day. When no such means is available for a flight recorder, the operator should perform an operational check of this flight recorder at time intervals not exceeding 7 days.          ...          Comment:          A pre-flight test (IBIT) isn't available on FDR, we propose to detail that on FDR the CBIT is an acceptable means to check a FDR for proper operation.          Proposed text:          ...          (c) When installed, the aural or visual means for pre-flight checking the flight recorders for proper operation should be used every day. The CBIT on FDR is an automatic means and is an acceptable means. When no such means is available for a flight recorder, the operator should perform an operational check of this flight recorder at time intervals not exceeding 7 days.          ...</p>
response	<p>Not accepted.</p>

NPA 2013-26 has already proposed guidance that clarifies the meaning of an 'aural or visual means for pre-flight checking the flight recorders for proper operation'.

Refer to paragraph GM3 CAT.GEN.MPA.195(b) proposed by NPA 2013-26:

'For the purpose of operational checks:

...

(b) an 'aural or visual means for pre-flight checking a flight recorder for proper operation' is an aural or visual means for the flight crew to check, before the flight, the results of an automatically or manually initiated test of the flight recorder for proper operation.'

Hence the built-in test may be automatically (CBIT) or manually initiated (IBIT).

Paragraphs GM3 NCC.GEN.145(b) and GM3 SPO.GEN.145(b) proposed by NPA 2013-26 are providing the same definition.

comment

24

comment by: UK CAA

**Page No:** 29/30

**Paragraph No:** AMC1 CAT.GEN.MPA.195(b), sub-paragraph (a)(1) and (2)

**Comment:** The text of sub-paragraphs (a)(1) and (2) does not flow correctly. Suggest amend as proposed below.

**Justification:** Clarity.

**Proposed Text:**

"(1) ~~The time interval between two inspections of the recording should not exceed 3 months~~ For a flight recorder that is recording on magnetic wire or is using frequency modulation technology, **the time interval between two inspections of the recording should not exceed 3 months.**

(2) ~~The time interval between two inspections of the recording may be up to 2 years if the~~ **For a** flight recorder that is solid-state and the flight recorder system is fitted with continuous monitoring for proper operation, **the time interval between two inspections of the recording may be up to 2 years."**

response

Accepted.

This change has been applied to AMC1 CAT.GEN.MPA.195(b), to AMC1 NCC.GEN.145(b) and to AMC1 SPO.GEN.145(b).

comment

25

comment by: UK CAA

**Page No:** 30

**Paragraph No:** AMC1 CAT.GEN.MPA.195(b), sub-paragraph (a)(2) & (a)(4)(iii)

**Comment:** Although solid state (SS) technology is more reliable than older recording media types, it may be more suitable to require non-FDM Operators to inspect their SS FDR every 12 months and for FDM Operators, every two years. To align with this, the alleviation of the requirement for an FDR inspection by using the FDM programme (which also requires a solid state FDR) to check the mandatory parameters should also be every two years. This is also relevant to the proposed amendment for where two FDRs are fitted in different positions.

**Justification:**

(1) The NPA acknowledges FDR recording inspections involve more in depth examination, not covered by simple routine serviceability operational checks/built in test equipment on SS FDRs, looking at checks of the quality of the data for the mandatory parameters recorded on the FDR.

Increasing the SS FDR recording inspection interval has implications for potential

accident/serious incident investigations. This is especially true for non-FDM Operators, who will not have regular views/identification of parameter problems via an FDM programme. For these Operators, increasing the interval will increase the risk of a parameter acquisition/recording quality problem not being identified in the interval period, thus potentially negatively affecting investigation (relevant to paragraph 1.2.2. Risk severity on page 68). In this case, increasing the interval between the inspection of the recording somewhat contradicts the objective highlighted on page 74, paragraph (2) Objectives: *'The specific objective of this proposal is, therefore, to increase the reliability of flight recorders currently installed on aircraft subject to European air operation rules'*.

Conversely an increased inspection interval of two years for SS FDRs (as detailed in the NPA) makes more sense for Operators with FDM programmes that have the opportunity to regularly review flight data and identify reliability problems.

**(2)** Proposing an interval of every two years for the inspection of certain SS FDRs, whilst proposing a more frequent interval requirement for using the FDM programme to assess the mandatory parameters, as an alternative to an FDR inspection, is counterintuitive. The incentive for an Operator to do so via an FDM programme is reduced, as it would mean moving from quality checking the FDR parameters every two years to once a year. Thus it is more proportionate to also have an increased (i.e. every two years) interval for those who wish to follow the alleviation and use their FDM programme to check the mandatory parameters instead of via an FDR recording inspection.

**(3)** *For non-FDM operators:* there would still be an economic incentive for operators to change to newer FDR technology even without the proposal to increase the FDR recording inspection interval for certain SS FDRs, as the NPA proposes greater inspection frequency for FDRs using magnetic wire or frequency modulation (AMC1 CAT.GEN.MPA.195(b)) than what is currently the case for SS FDRs.

*For FDM Operators:* the economic incentive is preserved and this is also passed on in the case of the alleviation to an FDR inspection.

response

Partially accepted.

(1) A time interval of 1 year is consistent with the recommendations of former national guidance like CAP 731 published by the CAA UK, and it is considered adequate for a magnetic tape flight recorder. However it does not account for the reliability of modern solid-state flight recorders.

Therefore, subparagraph (a)(2) of AMC1 CAT.GEN.MPA.195(b) offers the possibility to extend the periodicity of the recording inspection to two years for a solid-state flight recorder, under conditions that allow to assume firstly a high level of reliability and secondly a timely feedback if the flight recorder fails.

These conditions are met if:

- the flight recorder is solid-state (reliable recording technology); and
- the flight recorder system is fitted with continuous monitoring for proper operation, and in addition the aural or visual means for pre-flight checking the flight recorders for proper operation are used every day, or if they are not available, an operational check is performed at time intervals not exceeding 7 days (timely feedback if the flight recorder fails).

These criteria are independent from the implementation or not of an FDM programme by the aircraft operator.

(2) Indeed in the case of the alleviation offered by sub-paragraph (a)(4) of AMC1 CAT.GEN.MPA.195(b), a check of the mandatory flight parameters should

not be required at shorter time intervals than in the case of a solid-state flight recorder (sub-paragraph (a)(2)). The condition (a)(4)(iii) has been corrected so that the integrity of all mandatory flight parameters is verified by the FDM programme at time intervals not exceeding 2 years instead of 1 year. The correction has also been applied to AMC1 NCC.GEN.145(b) and to AMC1 SPO.GEN.145(b).

(3) As indicated in paragraph 1.3.3 of RIA A of NPA 2013-26, very few flight recorders equipping aircraft operated by EASA Member State operators are magnetic wire flight recorders or frequency modulation flight recorders. On the other hand, it is assumed that around 20 % of FDRs and 30 % of CVRs installed on aeroplanes operated by EASA Member State operators are magnetic tape (for helicopters, the proportions are assumed to be 50 % and 50 % respectively). So it is not the shorter time interval of the recording inspection for flight recorders using magnetic wire or frequency modulation which will create an incentive to install solid-state flight recorders, but rather the relaxed time interval for solid-state flight recorders compared to magnetic-tape flight recorders.

comment

26

comment by: UK CAA

**Page No:** 30**Paragraph No:** AMC1 CAT.GEN.MPA.195(b), sub-paragraph (a)(4)

**Comment:** The AMC discusses the requirements to qualify for the alleviation from the FDR recording inspection, but there doesn't seem to be any EASA guidance on what should be checked, although there is specific guidance for FDR recording inspections in GM1 CAT.GEN.MPA.195(b). It would be helpful if reference was made to the applicability of **GM1 CAT.GEN.MPA.195(b)** in the equivalent AMC or a variation of this text, for the case of the alleviation as well.

**Justification:** Operators should not be confused as to whether the principles of what has to be checked during an FDR recording inspection still apply to doing so via an FDM programme

response

Accepted.

Condition (iii) of AMC1 CAT.GEN.MPA.195(b), sub-paragraph (a)(4) is that a recording inspection similar to the recording inspection of the FDR recording is conducted at regular intervals on the FDM data, in order to check the validity of the mandatory flight parameters.

The wording of condition (a)(4)(iii) has been clarified.

This correction has also been applied to AMC1 NCC.GEN.145(b) and to AMC1 SPO.GEN.145(b).

comment

28

comment by: UK CAA

**Page No:** 30**Paragraph No:** AMC1 CAT.GEN.MPA.195(b), sub-paragraph (c)

**Comment:** The requirement in sub-paragraph (c) for an inspection of the flight recorders to be carried out "every day" is not considered either practical or necessary. It is presumed that what is meant here is before the 'first flight of the day' as partly discussed at paragraph 2.4.2 on page 15:

"(5) A new provision is added recommending that the means for **pre-flight checking** the flight recorder for proper operation should be checked daily, when available, or that an alternative operational check is performed at time intervals not exceeding 7 days...."

It is recommended that this section is reviewed to ensure that the intent is

	properly captured in the text and explanatory material. <b>Justification:</b> Clarity of intent and proportionality.
response	Not accepted.  As proposed in NPA 2013-26, sub-paragraph (c) of AMC1 CAT.GEN.MPA.195(b) is recommending that the means for pre-flight checking the flight recorders for proper operation are used 'every day', because this provides for more operational flexibility than prescribing that this check is conducted before the first flight of the day.  In addition, according to sub-paragraph (c) of AMC1 CAT.GEN.MPA.195(b), if such means for pre-flight checking is not available, an operational check of the flight recorder should be conducted at time intervals not exceeding 7 days. The intent of this sub-paragraph is that the proper operation of the flight recorder is checked at intervals of a few days in all cases. The time of the day at which this check is taking place does not matter.
comment	45 <span style="float: right;">comment by: FAA</span>  It is unclear if "commander" and "pilot-in-command" are meant to be synonyms. If so, pick one throughout. If not, define each and distinguish use in context.
response	Not accepted.  See reply to comment 42.

**Draft Decision – 3.2.2 Amendment of AMC/GM to Annex IV (Part CAT – Commercial air transport operations) – Subpart D – Instruments, data, equipment – Section 1 – Aeroplanes**

p. 32-33

comment	57 <span style="float: right;">comment by: Airbus Operations GmbH</span>  <b><u>AIRBUS Comment on AMC2 CAT.IDE.A.285(f):</u></b> AIRBUS identifies following issues concerning rulemaking related to localising accident sites (Point of impact with the earth's surface): EASA NPA CAT.IDE.A.285(f) requires a localisation means for only "flight over-water" operations. AMC 2 and GM1 of CAT.IDE.A.285(f) are not clear at this point, because both refer to "Point of impacts with the earth's surface". The examples of possible solutions <sup>[1]</sup> , EASA mentioned within AMC2 and GM1 can be considered as means which would comply with requirements for both over-water, and with uncontrolled airspace operation. The NPA CAT.IDE.A.285(f) covers mainly the ICAO Annex 6, chapter 6.5.3.c[2], however, there are ongoing discussions (ICAO/ANC), which may result in a request that also <b>operating in any uncontrolled airspace</b> (not only "over water") shall provide means to localise an accident site by 6nm accuracy <sup>[3]</sup> . Before making a decision on an implementation, following criteria shall be considered in order to develop the most effective solution: 1. 1. Will requirements (issued by EASA, and ICAO), include localisation means for uncontrolled airspace (general earth's surface), in addition to the flight over-water operations? 2. 2. Will such requirements be applicable for forward-fit (manufacturing) A/C only (as it is proposed by ICAO/FLIREC), or will retrofit be required (as NPA 26-2013 CAT.IDE.A.285(f) asking CofA 1.Jan 2005)?
---------	--

3. 3. When the requirement should be effective (2018 refer to ICAO Annex 6, chapter 6.5.3. or 2019 EASA NPA)?

In case ICAO or EASA will issue additional requirements, which includes localisation on earth' surface (land and water), then a low-frequency ULD (as mentioned in CAT.IDE.A.285(f)) would not be usable alone as means of compliance, another additional means must be installed. On the other hand, all of the alternative solutions, mentioned by AMC2 and GM1, are potential candidates suitable for both, "over water" and as well "land" localisation.

ICAO did not issue the associated SARP so far, therefore AIRBUS would recommend postponing the NPA CAT.IDE.A.285(f) and associated AMC/GM. Currently AIRBUS is not able to estimate matured availabilities of the several technologies, which are mentioned as candidates to allow compliance with the proposed regulation. Although some equipment would be available in coming time, e.g. the low-frequent ULD, their industrialisation is still unclear. For others, no estimate can be made with respect to the time, when they would be available. An effective date of the rule, earlier than suitable technologies will become mature would preclude these technologies. This would be disadvantageous, in case such technologies would otherwise perfectly serve as means for the 6nm localisation.

AIRBUS expects results of the studies mentioned above by 2016. AIRBUS proposes to provide EASA information on the results then, which may help to select the most effective solution.

There are also other options that will be studied concerning their usability as possible means to comply with a 6nm localisation requirement. For instance, the Next Generation of automatic ELTs (NG-ELT) may overcome the weakness of current ELT technology. EUROCAE WG-48 and RTCA SC 229 have just been launched, with support of EASA and FAA. One objective of these WGs will be to determine the suitability of the NG-ELT compliance means with the 6nm rule. If successful, the NG-ELT would match with the GM1 CAT.IDE.A.285(f), (c)(2). But currently, it is too early to justify this point.

AIRBUS wants to select the right technology, which would comply optimally with any near and medium term effective regulations, assuming that regulations for operation in uncontrolled areas will become valid.

Most of the mentioned technologies are part of current research & technology studies. Of course, costs for installation/operations are an important factor. The cost factor would increase significantly, if retrofit would become part of the new regulation, independent of whatever solution would be selected.

The costs to introduce low frequency ULD may be considered as being moderate. However this solution would limit the effectiveness (no immediate S&R support, no direct localisation data), which are part of other solutions. Disadvantageous is that an ULD is useful for a case, when the wreckage is below circa 3000m under water<sup>[4]</sup> and for detection of longer distance. In case of an accident on any earth' surface (land) the ULD cannot work.

Furthermore the retrofit requirement would preclude some of the possible solutions (e.g. deployable ELT/recorder). This technology would only be designed for new design aircraft, because of reasonable costs calculations. Basically, AIRBUS did not consider so far retrofit scenario for any of the technology studies mentioned above. Retrofit of the ULD is technically feasible, but is still a significant cost factor for operators. AIRBUS proposed to select a suitable way to include only more modern aircraft, and to exclude older aircraft types (e.g. A300/A310).

**AIRBUS Proposals:**

- 1. 1. AIRBUS proposes postponing the NPA CAT.IDE.A.285(f) until a harmonised decision will be available based on an ICAO Annex 6 SARP. In addition, a harmonisation with other AA, e.g. FAA is highly recommended.**
- 2. 2. AIRBUS proposes that Retrofit should be excluded, mainly because**



**additional installation/operations costs are an important factor compared to solutions for forward fit design.**

[1] AMC 2 CAT.IDE.A.285(f): Periodic transmission and Triggered transmission of aircraft position data; Automatic deployable flight recorder/ELT.

[2] Applicable for aeroplanes on long-range over water flights.

[3] Refer to ..... Accident Investigation Agencies advised within FLIREC that localization of wreckage site and recorders is not only over-water accident is an issue, but a general issue.

[4] Up to this range, the "normal" Recorder attached ULBs are detectable (1800 to 3600 meters), dependent on the sea state, nearby boats, marine animals, gas or oil lines, and other factors contributing to the ambient noise level will affect the range at which the beacon can be detected.

response Not accepted.

See response to Comment number 56.

comment 58

comment by: Airbus Operations GmbH

**AIRBUS Comment on GM1 CAT.IDE.A.285(f):**

AIRBUS identifies following issues concerning rulemaking related to localising accident sites (Point of impact with the earth' surface):

EASA NPA CAT.IDE.A.285(f) requires a localisation means for only "flight over-water" operations. AMC 2 and GM1 of CAT.IDE.A.285(f) are not clear at this point, because both refer to "Point of impacts with the earth's surface". The examples of possible solutions<sup>[1]</sup>, EASA mentioned within AMC2 and GM1 can be considered as means which would comply with requirements for both over-water, and with uncontrolled airspace operation.

The NPA CAT.IDE.A.285(f) covers mainly the ICAO Annex 6, chapter 6.5.3.c[2], however, there are ongoing discussions (ICAO/ANC), which may result in a request that also **operating in any uncontrolled airspace** (not only "over water") shall provide means to localise an accident site by 6nm accuracy<sup>[3]</sup>.

Before making a decision on an implementation, following criteria shall be considered in order to develop the most effective solution:

1. 1. Will requirements (issued by EASA, and ICAO), include localisation means for uncontrolled airspace (general earth's surface), in addition to the flight over-water operations?

2. 2. Will such requirements be applicable for forward-fit (manufacturing) A/C only (as it is proposed by ICAO/FLIREC), or will retrofit be required (as NPA 26-2013 CAT.IDE.A.285(f) asking CofA 1.Jan 2005)?

3. 3. When the requirement should be effective (2018 refer to ICAO Annex 6, chapter 6.5.3. or 2019 EASA NPA)?

In case ICAO or EASA will issue additional requirements, which includes localisation on earth' surface (land and water), then a low-frequency ULD (as mentioned in CAT.IDE.A.285(f)) would not be usable alone as means of compliance, another additional means must be installed. On the other hand, all of the alternative solutions, mentioned by AMC1 and GM1, are potential candidates suitable for both, "over water" and as well "land" localisation.

ICAO did not issue the associated SARP so far, therefore AIRBUS would recommend postponing the NPA CAT.IDE.A.285(f) and associated AMC/GM. Currently AIRBUS is not able to estimate matured availabilities of the several technologies, which are mentioned as candidates to allow compliance with the proposed regulation. Although some equipment would be available in coming

time, e.g. the low-frequency ULD, their industrialisation is still unclear. For others, no estimate can be made with respect to the time, when they would be available. An effective date of the rule, earlier than suitable technologies will become mature would preclude these technologies. This would be disadvantageous, in case such technologies would otherwise perfectly serve as means for the 6nm localisation.

AIRBUS expects results of the studies mentioned above by 2016. AIRBUS proposes to provide EASA information on the results then, which may help to select the most effective solution.

There are also other options that will be studied concerning their usability as possible means to comply with a 6nm localisation requirement. For instance, the Next Generation of automatic ELTs (NG-ELT) may overcome the weakness of current ELT technology. EUROCAE WG-48 and RTCA SC 229 have just been launched, with support of EASA and FAA. One objective of these WGs will be to determine the suitability of the NG-ELT compliance means with the 6nm rule. If successful, the NG-ELT would match with the GM1 CAT.IDE.A.285(f), (c)(2). But currently, it is too early to justify this point.

AIRBUS wants to select the right technology, which would comply optimally with any near and medium term effective regulations, assuming that regulations for operation in uncontrolled areas will become valid.

Most of the mentioned technologies are part of current research & technology studies. Of course, costs for installation/operations are an important factor. The cost factor would increase significantly, if retrofit would become part of the new regulation, independent of whatever solution would be selected.

The costs to introduce low frequency ULD may be considered as being moderate. However this solution would limit the effectiveness (no immediate S&R support, no direct localisation data), which are part of other solutions. Disadvantageous is that an ULD is useful for a case, when the wreckage is below circa 3000m under water<sup>[4]</sup> and for detection of longer distance. In case of an accident on any earth' surface (land) the ULD cannot work.

Furthermore the retrofit requirement would preclude some of the possible solutions (e.g. deployable ELT/recorder). This technology would only be designed for new design aircraft, because of reasonable costs calculations. Basically, AIRBUS did not consider so far retrofit scenario for any of the technology studies mentioned above. Retrofit of the ULD is technically feasible, but is still a significant cost factor for operators. AIRBUS proposed to select a suitable way to include only more modern aircraft, and to exclude older aircraft types (e.g. A300/A310).

#### **AIRBUS Proposals:**

- 1. 1. AIRBUS proposes postponing the NPA CAT.IDE.A.285(f) until a harmonised decision will be available based on an ICAO Annex 6 SARP. In addition, a harmonisation with other AA, e.g. FAA is highly recommended.**
- 2. 2. AIRBUS proposes that Retrofit should be excluded, mainly because additional installation/operations costs are an important factor compared to solutions for forward fit design.**

[1] AMC 2 CAT.IDE.A.285(f): Periodic transmission and Triggered transmission of aircraft position data; Automatic deployable flight recorder/ELT.

[2] Applicable for aeroplanes on long-range over water flights.

[3] Refer to ..... Accident Investigation Agencies advised within FLIREC that localization of wreckage site and recorders is not only over-water accident is an issue, but a general issue.

[4] Up to this range, the "normal" Recorder attached ULBs are detectable (1800 to 3600 meters), dependent on the sea state, nearby boats, marine animals, gas or oil lines, and other factors contributing to the ambient noise level will affect the

	range at which the beacon can be detected.
response	Not accepted.  See response to Comment number 56.
comment	80 <span style="float: right;">comment by: <i>Blake van den Heuvel</i></span>  <b>Comment on</b> AMC2 CAT.IDE.A.285(f) Flight over water AUTOMATIC MEANS TO DETERMINE THE LOCATION OF THE POINT OF IMPACT WITH THE EARTH'S SURFACE WITHIN 6 NM ACCURACY <b>DRS concur with the NPA that the use of 'G' switches not be the only acceptable mean of detecting a Negative Acceleration event "crash". Over its 40+ year history, DRS have attempted to incorporate 'G' switches in its systems. Almost universally, during qualification testing, the 'G' switch has shown to be a cause of Un-Commanded deployment. Even as late as 2013, it was DRS' experience that the most modern multi-axis 'Smart Switches' do not achieve the reliability required for this purpose.</b>
response	Noted. We thank you for this comment.
comment	81 <span style="float: right;">comment by: <i>Blake van den Heuvel</i></span>  <b>Comment 1 on</b> GM1 CAT.IDE.A.285(f) Flight over water <u>AUTOMATIC MEANS TO DETERMINE THE LOCATION OF THE POINT OF IMPACT WITH THE EARTH'S SURFACE WITHIN 6 NM ACCURACY</u> <b>As per above, DRS concur with this section. It is very important for a Deployable Recorder or Deployable ELT to only deploy upon confirmed "significant deformation". For this reason DRS does not employ the use of "G' switch, but rather on sensors that trigger upon positive deformation of the aircraft structure and or submersion in water.</b> <b>Comment 2 on</b> GM1 CAT.IDE.A.285(f) Flight over water <u>AUTOMATIC MEANS TO DETERMINE THE LOCATION OF THE POINT OF IMPACT WITH THE EARTH'S SURFACE WITHIN 6 NM ACCURACY</u> <b>DRS fully concur with (c)(3).</b>
response	Noted. The Agency thanks you for this comment.

**Draft Decision – 3.2.3 Amendment of AMC/GM to Annex VI (Part NCC Non-commercial operations with complex motor-powered aircraft) – Subpart A –** p. 34-37  
**General requirements**

comment	29 <span style="float: right;">comment by: <i>UK CAA</i></span>  <b>Page No:</b> 35 <b>Paragraph No:</b> AMC1 NCC.GEN.145(b), sub-paragraphs (a)(1) and (2) <b>Comment:</b> The text of sub-paragraphs (a)(1) and (2) does not flow correctly. Suggest amend as proposed below. <b>Justification:</b> Clarity. <b>Proposed Text:</b> <del>"(1) The time interval between two inspections of the recording should not exceed 3 months</del> For a flight recorder that is recording on magnetic wire or is using frequency modulation technology, <b>the time interval between two inspections</b>
---------	--

**of the recording should not exceed 3 months.**

(2) ~~The time interval between two inspections of the recording may be up to 2 years if the~~ **For a** flight recorder that is solid-state and the flight recorder system is fitted with continuous monitoring for proper operation, **the time interval between two inspections of the recording may be up to 2 years."**

response Partially accepted.

See reply to comment 24.

comment 30

comment by: UK CAA

**Page No:** 36

**Paragraph No:** AMC1 NCC.GEN.145(b), sub-paragraph (c)

**Comment:** The requirement in sub-paragraph (c) for an inspection of the flight recorders to be carried out "every day" is not considered either practical or necessary. It is presumed that what is meant here is before the 'first flight of the day' as partly discussed at paragraph 2.4.2 on page 15:

"(5) A new provision is added recommending that the means for **pre-flight checking** the flight recorder for proper operation should be checked daily, when available, or that an alternative operational check is performed at time intervals not exceeding 7 days...."

It is recommended that this section is reviewed to ensure that the intent is properly captured in the text and explanatory material.

**Justification:** Clarity of intent and proportionality.

response Not accepted.

See reply to comment 28.

**Draft Decision – 3.2.4 Amendment of AMC/GM to Annex VIII (Part SPO Specialised operations) – Subpart A – General requirements**

p. 38-41

comment 3

comment by: DGAC France

Reference number of AMC1 SPO.GEN.145(a) should be changed to AMC1 SPO.GEN.150(a)

response Not accepted.

In Annex II to Commission Regulation (EU) No 379/2014 (introducing the implementing rules for Part-SPO), the paragraph related to the preservation, production and used of flight recorders is numbered SPO.GEN.145.

comment 5

comment by: DGAC France

Reference number of AMC1 SPO.GEN.145(b) should be changed to AMC1 SPO.GEN.150(b)

response Not accepted.

In Annex II to Commission Regulation (EU) No 379/2014 (introducing the implementing rules for Part-SPO), the paragraph related to the preservation, production and used of flight recorders is numbered SPO.GEN.145.

comment	31	comment by: UK CAA
	<p><b>Page No:</b> 39  <b>Paragraph No:</b> AMC1 SPO.GEN.145(b), sub-paragraph (a)(1) and (2)  <b>Comment:</b> The text of sub-paragraphs (a)(1) and (2) does not flow correctly. Suggest amend as proposed below.  <b>Justification:</b> Clarity.  <b>Proposed Text:</b>  <del>“(1) The time interval between two inspections of the recording should not exceed 3 months</del> For a flight recorder that is recording on magnetic wire or is using frequency modulation technology, <b>the time interval between two inspections of the recording should not exceed 3 months.</b>  <del>(2) The time interval between two inspections of the recording may be up to 2 years if the</del> <b>For a</b> flight recorder that is solid-state and the flight recorder system is fitted with continuous monitoring for proper operation, <b>the time interval between two inspections of the recording may be up to 2 years.”</b></p>	
response	<p>Partially accepted.</p> <p>See reply to comment 24.</p>	
comment	32	comment by: UK CAA
	<p><b>Page No:</b> 40  <b>Paragraph No:</b> AMC1 SPO.GEN.145(b), sub-paragraph (c)  <b>Comment:</b> The requirement in sub-paragraph (c) for an inspection of the flight recorders to be carried out “every day” is not considered either practical or necessary. It is presumed that what is meant here is before the ‘first flight of the day’ as partly discussed at paragraph 2.4.2 on page 15:  “(5) A new provision is added recommending that the means for <b>pre-flight checking</b> the flight recorder for proper operation should be checked daily, when available, or that an alternative operational check is performed at time intervals not exceeding 7 days....”  It is recommended that this section is reviewed to ensure that the intent is properly captured in the text and explanatory material.  <b>Justification:</b> Clarity of intent and proportionality.</p>	
response	<p>Not accepted.</p> <p>See reply to comment 28.</p>	

**6. Appendices – (ii) – RIA A: Discontinuation of obsolete recording technologies – 5. Analysis of impacts – 5.1. Safety impact – 5.1.5. Option 4**

p. 80

comment	33	comment by: UK CAA
	<p><b>Page No:</b> 80  <b>Paragraph No:</b> 5.1.5 Option 4 (1+3)  <b>Comment:</b> This option does not address the reliability issues of magnetic tape FDRs as it does for magnetic wire and frequency modulation technologies. It is acknowledged in the NPA that magnetic tape FDRs are the most common of obsolete technologies (see page 79, 5.1.2, last paragraph). Therefore it stands to reason that these should be targeted as well. In addition to this, page 9, section 2.1 (a) states that one of the issues to be addressed is the unreliability of obsolete recording technologies for FDRs, including magnetic tape.</p>	

	<p><b>Justification:</b> To align and support the NPA objective on page 9, paragraph 2.1 (a)</p>
response	<p>Not accepted.</p> <p>As explained in paragraph 5.1.4 of regulatory impact assessment (RIA) A of NPA 2013-26:          'it is expected that magnetic tape FDRs will already be seldom on the aeroplane fleets of EASA Member States operators by 2019. When considering helicopters, the proportion of magnetic tape FDRs, which is assumed to be currently 50 %, would not become negligible before 2028. However, given that there are in average 16 accidents or serious incidents of aeroplanes of EASA Member States operators for 1 accident or serious incident of helicopter (see 2.2.1.1), a mandatory replacement of the magnetic tape FDRs on board helicopters by solid-state FDRs would bring limited safety benefits overall.'. Refer also to paragraph 1.3.3 of RIA A (pages 70 and 71). Therefore, Option 4 (1+3) only contains a retrofit of magnetic tape CVRs.</p> <p>Note:          Subparagraph 2.1.a on page 9 is stating that the unreliable technologies 'are still in use among flight recorders on board aircraft registered in Europe'. The term 'flight recorders' encompasses CVRs and FDRs.</p>

**6. Appendices – (ii) – RIA A: Discontinuation of obsolete recording technologies – 6. Conclusion and preferred option**

p. 90-94

comment	12	comment by: <i>BEA</i>
	<p>BEA comments: BEA experience has shown that new-generation flight recorders based on solid-state technology have improved the capability to retrieve data necessary for the understanding of the causes of accidents. BEA is supporting the preferred option of the EASA with more frequent recording inspections and then removal of tape and wire based flight recorders.</p>	
response	<p>Noted. The Agency thanks you for this comment.</p>	

**6. Appendices – (iii) – RIA B: CVR overrun after an accident or a serious incident – 1. Issues to be addressed – 1.1. What is the issue and the current regulatory framework?**

p. 96-105

comment	67	comment by: <i>European Cockpit Association</i>
	<p>The paragraph 1.1.1 states that "the majority of cases of CVR overruns were found during the investigation of a serious incident".          Although paragraph 1.3.1 mentions the chance of discrepancies between a recording and flight crew statements, the analysis does not consider the fact that flight crews can be interviewed after an incident. This fact minimizes the need for a recording. Also a provision to stop the CVR during flight will further decrease the problem of a CVR overrunning. The reasons for eliminating such a provision are not mentioned in NPA 2013-26.</p>	
response	<p>Not accepted.</p> <p>As explained in paragraph 1.3.1 of regulatory impact assessment B of NPA 2013-</p>	

26:

'investigation experience shows that the CVR recording and flight crew statement do not contain equivalent information. The CVR records faithfully the history of verbal communications, alarms and sounds heard in the cockpit, while a reconstruction simply based on human memory cannot be that accurate. On the other hand, the statements provided by flight crew members are very useful to understand unrecorded information, such as where their attention was focussed, what each member perceived of the occurrence, if they had non-verbal communications, what was their fatigue condition, etc.

Hence, the CVR recording and the flight crew interview should be considered complementary rather than equivalent sources of information for the safety investigation. Safety investigators usually make use of both sources to reconstruct an accurate and complete picture of the human-human interactions and human-machine interactions.'

Thus, paragraph 1.3.1 clearly indicates the complementarity between the flight crew statement (when available) and the CVR recording, and explains why a flight crew interview is not sufficient for the purpose of a safety investigation.

The possibility for the commander to disable or switch off the CVR when 'he/she believes that the recorded data, which otherwise would be erased automatically, should be preserved for incident or accident investigation' (refer to paragraph OPS 1.085 of Annex to Commission Regulation (EC) 859/2008 (EU OPS)) was already removed in subparagraph (10) of CAT.GEN.MPA.105, it is not a change proposed by NPA 2013-26. This is why the reasons for this change are not indicated in NPA 2013-26.

This change of OPS 1.085 was made to address a recommendation of the Flight Recorder Study Group (FRSG) of the Joint Aviation Authorities, before the rulemaking competency for air operation rules was transferred to the Agency. The FRSG considered that in case of a serious incident, it is preferable to let the CVR activated and lose the relevant part of the recording, rather than running the risk that the serious incident develops into an accident and that audio essential for understanding this accident is missing because the CVR was deactivated. However, after completion of a flight with a serious incident, when there is no risk of an accident, all necessary measures to preserve the recordings shall be taken.

For this reason, ECA proposal to reinstate the privilege of the commander to switch off or disable the CVR in flight is not accepted.

**6. Appendices – (iii) – RIA B: CVR overrun after an accident or a serious incident – 1. Issues to be addressed – 1.3. Who is affected?**

p. 108-109

comment

73

comment by: *European Cockpit Association*

The paragraph 1.1.1 states that "the majority of cases of CVR overruns were found during the investigation of a serious incident".

Although paragraph 1.3.1 mentions the chance of discrepancies between a recording and flight crew statements, the analysis does not consider the fact that flight crews can be interviewed after an incident. This fact minimizes the need for a recording. Also a provision to stop the CVR during flight will further decrease the problem of a CVR overrunning. The reasons for eliminating such a provision are not mentioned in NPA 2013-26.

response

Not accepted.

See reply to comment 67.

**6. Appendices – (iii) – RIA B: CVR overrun after an accident or a serious incident – 5. Analysis of impacts – 5.1. Safety impact – 5.1.2. Option 1**

p. 112-113

comment 70

comment by: *European Cockpit Association*

- Option 1 (regulatory changes to stop the CVR) already decreases the recording overrun problem by 66%, however the impact of this is only rated "slightly positive".
- Option 2 (increase of recording duration to two hours) mentions that only 3 out of 31 cases (10%) would have profited from an increase of recording duration from 30 minutes to two hours. Nevertheless the impact of this option is rated "medium". (Higher compared to option 1)
- Option 3 (recording time increased to 15 hours) As mentioned before, the analysis for option 2 only identified 3 out of 31 cases where more than 30 minutes recording time would have had a beneficial effect on the investigation. Still, the rating for option 3 is set at "very positive", without any further evidence to support this opinion.

response

Not accepted.

- Option 1:

As explained in paragraph 5.1.2 of regulatory impact assessment (RIA) B of NPA 2013-26:

'Hence, around two thirds of CVR overruns could have been avoided if appropriate measures had been taken to preserve the CVR recording.

However, with the increase of safety investigations on serious incidents, this proportion is expected to decrease, as 30 minutes is too short a recording duration in many serious incidents, whatever the effectiveness of CVR preservation measures. In fact, when considering investigation reports on occurrences which happened on or after 1 January 2007, the proportion is 10/19 i.e. roughly half of CVR overruns could have been avoided if appropriate measures had been taken to preserve the CVR recording.'

Hence the proportion of CVR overruns that could have been avoided with preservation measures is only half when considering recent occurrences. Since 2010, safety investigation authorities of EASA Member States must investigate serious incidents (according to Regulation (EU) 996/2010), and there are around 4 times more serious incidents than accidents. So, the proportion of CVR overruns avoided just by reinforcing preservation measures is expected to decrease significantly over time and its safety impact on the long term is considered slightly positive.

- Option 2:

It is not stated in RIA B that only 3 out of 31 cases (10 %) would have profited from an increase of recording duration from 30 minutes to 2 hours. Paragraph 5.1.3 of RIA B states that 'In Table B.C.1 of Annex C, for only 3 cases (HB-IWF,



G-BZAT and C-GPAT) would a 2-hour recording duration CVR have made a difference with a 30-minute recording duration CVR.' Table B.C.1 of Annex C of RIA B presents 15 investigation reports, not 31.

In addition, as explained above for Option 1, more and more serious incidents are investigated, and for most serious incidents 30 minutes is too short a recording duration. As explained in paragraph 5.1.3 of RIA B:

'it must be recognised that 30-minutes are not adequate a duration to preserve the CVR after completion of the flight. In the case of aeroplanes, 5 to 15 minutes usually elapse between the landing and the time when the flight can be considered completed (taxiing to parking stand or aircraft evacuation). A 2-hour recording duration would give better time margins in this regard, and, therefore, more chance to preserve the CVR recording, provided appropriate and timely measures are taken (see Option 1).

In addition, 30-minute CVRs are for the most part magnetic tape CVRs and, in addition to the duration issue, their reliability is problematic, as for 20 % of the CVRs read out in the frame of a safety investigation, the recording quality was found poor (see Regulatory Impact Assessment A on 'Discontinuation of obsolete recording technologies'). They should be replaced by more reliable CVRs.'

Hence the safety impact of option 2 is considered medium positive, because it combines an increased recording duration that gives more time margin for preserving the recording, and an increased reliability through the replacement of obsolete magnetic-tape technology by more reliable solid-state technology.

- Option 3:

The statement that 'the analysis for option 2 only identified 3 out of 31 cases where more than 30 minutes recording time would have had a beneficial effect on the investigation' is not correct. Paragraph 5.1.3 of RIA B states that 'In Table B.C.1 of Annex C, for only 3 cases (HB-IWF, G-BZAT and C-GPAT) would a 2-hour recording duration CVR have made a difference with a 30-minute recording duration CVR.' Table B.C.1 of Annex C of RIA B presents 15 investigation reports, not 31.

Most of the cases of CVR overruns that are presented in Annex C of RIA B would have been avoided, had the aircraft been fitted with a 15-hours recording duration CVR. This is because as explained in paragraph 5.1.4 of RIA B:

1. 'A CVR recording duration of 15 hours would allow preservation of the recording of any occurrence taking place during a 14-hour long flight, assuming that one hour is left to take appropriate measures to preserve the recording after completion of the flight.' and
2. 'A 15-hour recording duration would make the CVR recording more immune to inappropriate actions by the flight crew or maintenance personnel after a short-range flight, because in those cases the recording of the occurrence could be overwritten only if the CVR kept recording for hours after completion of the flight.'

Therefore, Option 3 is considered a very safety-effective option, however, it is long-term since it only affects large aeroplanes manufactured after 1 January 2019.

**6. Appendices – (iii) – RIA B: CVR overrun after an accident or a serious incident – 5. Analysis of impacts – 5.1. Safety impact – 5.1.3. Option 2**

p. 113

comment 71

comment by: *European Cockpit Association*

- Option 1 (regulatory changes to stop the CVR) already decreases the recording overrun problem by 66%, however the impact of this is only rated “slightly positive”.
- Option 2 (increase of recording duration to two hours) mentions that only 3 out of 31 cases (10%) would have profited from an increase of recording duration from 30 minutes to two hours. Nevertheless the impact of this option is rated “medium”. (Higher compared to option 1)
- Option 3 (recording time increased to 15 hours) As mentioned before, the analysis for option 2 only identified 3 out of 31 cases where more than 30 minutes recording time would have had a beneficial effect on the investigation. Still, the rating for option 3 is set at “very positive”, without any further evidence to support this opinion.

response Not accepted.

These statements are not correct. See reply to comment 70.

**6. Appendices – (iii) – RIA B: CVR overrun after an accident or a serious incident – 5. Analysis of impacts – 5.1. Safety impact – 5.1.4. Option 3**

p. 113

comment 72

comment by: *European Cockpit Association*

- Option 1 (regulatory changes to stop the CVR) already decreases the recording overrun problem by 66%, however the impact of this is only rated “slightly positive”.
- Option 2 (increase of recording duration to two hours) mentions that only 3 out of 31 cases (10%) would have profited from an increase of recording duration from 30 minutes to two hours. Nevertheless the impact of this option is rated “medium”. (Higher compared to option 1)
- Option 3 (recording time increased to 15 hours) As mentioned before, the analysis for option 2 only identified 3 out of 31 cases where more than 30 minutes recording time would have had a beneficial effect on the investigation. Still, the rating for option 3 is set at “very positive”, without any further evidence to support this opinion.

response Not accepted.

These statements are not correct. See reply to comment 70.

**6. Appendices – (iii) – RIA B: CVR overrun after an accident or a serious incident – 5. Analysis of impacts – 5.3. Social impact**

p. 114-117

comment

68

comment by: *European Cockpit Association*

Paragraph 5.3.4.1 mentions the increased use of recordings by the operator for option 3. This risk must be considered very real as this practice is already taking place. The provisions laid down in EU regulation 996/2010 require "consent from the crew". This protection can be considered insufficient since, especially with smaller operators, not giving consent may mean losing one's job. In this context, the conclusion that "the OPS rules provide for sufficient protection of the CVR recording in normal operation" is far too optimistic.

Furthermore the analysis mentions the risk of use of the recording in the context of a safety investigation. Even considering that the provisions as laid down in EU regulation 996/2010 may be sufficient, protection outside of Europe cannot be provided. National judicial authorities may decide on their own that the benefits of disclosing the CVR recording outweigh the adverse impact that such action may have on future safety investigations. This can lead, during court cases, to CVR recordings being used in a manner that is contrary to the right of privacy of flight crews.

An increase of the CVR recording duration would probably not lead to an increase of the frequency of cases where judicial authorities handle a CVR recording improperly. It might, however, lead to events not related to the occurrence (e.g. recording of previous flights) to be released to the public. This issue was so far theoretical given the short recording duration of the CVR, it could materialize with a 15 hours recording duration CVR.

In an attempt to minimize misuse of a recording after an uneventful flight one could argue that crews can use the bulk erase function after completion of the flight. However this does not protect against all cases of misuse. On most solid-state CVR models, the bulk erase function is so designed that the recording cannot be retrieved using any and all normal replay or copying techniques. However special techniques can still be used to retrieve the erased data.

Option 4 (implementation of options 1,2 and 3 together) mentions a "slightly positive" impact for options 1 and 2 while the associated paragraphs (5.3.2 and 5.3.3) state that their "impact is only neutral".

In view of the above, the conclusions of the social and safety impact analysis with regard to a recording time extension to 15 hours in NPA 2013-26 are highly biased in favour of an extension of the recording time to 15 hours. Arguments that explain the potential ramifications on the privacy of crews are underrated or not mentioned at all, while the advantages are overrated.

Furthermore, it must be stressed that the release or leaking of CVR recording material to the public or the press in even only one single high-profile event might have a negative impact on flight crew trust in the current safety system and might have negative effects on current safety levels for example by undermining willingness to report.

ECA would like to stress the importance of the following conclusions made by the EFRPG in this context, to be implemented before changing CVR recording duration:

1. " **5. The EU Member States should define penalties that dissuade effectively parties from illegally disclosing sensitive information, including CVR recordings.**"
2. " **8. Further efforts by all stakeholders will be necessary to prevent the misuse of CVR data and related breach of privacy issues, especially after an accident. These efforts should include strict application of the regulatory provisions and prosecution of offenders as well as education of the relevant stakeholders as to the importance of protection of data to the safety system.**"

Needless to state that similar provisions would need to be in place as a worldwide

response

standard.

As a result, ECA does not agree with the associated amendments in NPA 2013-26.

Partially accepted.

All the potential implications of introducing CVRs with a very long recording duration are presented in details in section 5.3 of regulatory impact assessment (RIA) B of NPA 2013-26. The assessment made in section 5.3 relies to a large extent on the evaluation made in the document titled 'Very long recording duration Cockpit Voice Recorder' produced by the European Flight Recorder Partnership Group (EFRPG). The EFRPG document contains recommendations related to the cooperation between safety investigation authorities and judicial authorities, and to the definition of penalties for disclosing illegally CVR recordings, however the EFRPG document does not state that those are pre-requisites to the introduction of 15 hours recording duration CVRs.

- Normal operation

With regards to the risk of abusive use of the CVR during normal operation, the Agency is not aware of any case of an EASA Member States' operator that was found to make such an abusive use. The provision that 'The cockpit voice recorder recordings may not be used for purposes other than for the investigation of an accident or incident subject to mandatory reporting except with the consent of all crew members concerned' is already in Annex I to Commission Regulation (EC) No 859/2008 (EU OPS): refer to paragraph OPS 1.160. In addition, the flight crew has always been entitled to use the bulk erase function of the CVR after an uneventful flight.

However, in order to prevent any abusive use of the CVR during normal operation in the future, provisions have been added in paragraphs CAT.GEN.MPA.195, NCC.GEN.145 and SPO.GEN.145 to provide for a reinforced control of the use of CVR recordings during normal operation. In particular, if a CVR recording is used for purposes other than investigation (by a safety investigation authority, the competent authority or the administration of justice) and other than for ensuring the CVR serviceability, then a procedure relating to the handling of the CVR recordings and transcripts shall be in place in addition to getting the prior consent by crew members and maintenance personnel concerned. A new AMC has also been inserted which identifies important elements of this procedure for handling CVR recordings, recommends that all information with a privacy content is removed from the recording at an early stage, and that the aircraft operator retains sufficient information on the use made of the CVR recording and evidence that this use got the prior consent of the persons concerned. A new GM has been inserted to explain why particular precautions must be taken when handling CVR recordings.

- Use by judicial authorities

The independence of judicial authorities and their privileged right to disclose pieces of evidence are mentioned in paragraph 5.3.4.3 of RIA B. However, cases of CVR recording misuse in the frame of a judicial investigation are not frequent in Europe. In addition, Regulation (EU) No 996/2010 requires in its Article 12 that EU Member States set up advance arrangements between safety investigation authorities and judicial authorities, that cover the use of information. It is expected that these arrangements will be in place by 2019 and that they will cover the handling of CVR recordings, since these recordings are identified as sensitive safety information by Article 14. As a result, the number of cases of CVR recordings released to the public by judicial authorities or leaked by one party to a process, which are already small today, is expected to further decrease in all EU

Member States.

**6. Appendices – (iii) – RIA B: CVR overrun after an accident or a serious incident – 6. Conclusion and preferred option**

p. 126-129

comment 13

comment by: BEA

BEA comments: In many cases the BEA has pointed out the lack of CVR data during serious incident investigations. In-depth investigations into serious incidents will be the heart of continuous safety improvement. A longer duration CVR is a key element to fully accomplishing this task. BEA is supporting the preferred option of the EASA and in particular the development of comprehensive procedures to ensure flight recorder preservation following an event and the installation of 15-hour CVR on new large built aircraft after 1<sup>st</sup> January 2019.

response

Noted. The Agency thanks you for this comment.

**6. Appendices – (iii) – RIA B: CVR overrun after an accident or a serious incident – 7. Annexes**

p. 130-140

comment 46

comment by: FAA

It is unclear if "commander" and "pilot-in-command" are meant to be synonyms. If so, pick one throughout. If not, define each and distinguish use in context.

response

Not accepted.

See reply to comment 42.

comment 47

comment by: FAA

Who is responsible, the commander, or the pilot in command? "...the commander or pilot in command..." as written leaves ambiguous who is responsible. If here the terms are meant to be synonymous, suggest "commander/PIC" or "commander (PIC)." If not meant to be the same, it is imperative to determine and publish which is responsible.

response

Not accepted.

See reply to comment 42.

**6. Appendices – (iv) – RIA C: Transmission time of the flight recorder ULDs – 6. Conclusion and preferred option**

p. 157-158

comment 14

comment by: BEA

BEA comments: BEA proved during the work of the "Flight Data Recovery" AF447 Working Group that the 90-day ULB (or ULD: Underwater Locator Beacon or Device) was a no-cost solution to help the recovery of flight recorders for all accidents over water. For the last twenty years, accidents over water have occurred one or twice a year to large transport category aircraft. 90-day ULBs were available on the market but were never installed. BEA is supporting the

	preferred option of the EASA to mandate the fitting of 90-day ULB on all aircraft required to carry a flight recorder by 1 <sup>st</sup> January 2020.
response	Noted. The Agency thanks you for this comment.

<b>6. Appendices – (v) – RIA D: Very long detection range ULD for wreckage localisation in oceanic areas – 1. Issues to be addressed – 1.2. Safety risk assessment</b>	p. 163-167
--	------------

comment	40	comment by: FAA
	The term "over water" needs clarification. Specifically, "...after an accident over water..." would seem to not account for a PIC homicide/suicide, for example, or for damage to the aircraft only upon impact with the water. Recommend you define "over water" to include on-water events, intentional (e.g., seaplane during takeoff run), or other.	
response	Partially accepted.  See response to comment 41.	

<b>6. Appendices – (v) – RIA D: Very long detection range ULD for wreckage localisation in oceanic areas – 1. Issues to be addressed – 1.3. Who is affected?</b>	p. 168-173
--	------------

comment	82	comment by: Blake van den Heuvel
	<p>Comment on <b>1.3.2.3. Accident localisation outside of ATM ground surveillance areas (d) and (e)</b></p> <p><b><i>As part of ED-112b, a Deployable Dual-Combined Deployable CVR/FDR integrated with an ELT, is deemed to be an equivalent substitute for a Dual-Combined Fixed CVR/FDR and a AF(ELT). This two for one substitution allows the installation of an ADFR to be a <u>cost neutral</u> to the Aircraft OEM.</i></b></p>	
response	<p>Not accepted.</p> <p>While fixed flight recorders and fixed ELTs have been installed on civilian aeroplanes for decades, this is not the case for deployable flight recorders. Given the little experience with deployable flight recorders on civilian aircraft, the Agency cannot confirm that the overall cost of a deployable flight recorder fitted with an ELT would be similar to the cost of a fixed flight recorder and a fixed ELT, even when considering newly manufactured aircraft.</p>	
comment	83	comment by: Blake van den Heuvel
	<p>Comment on last sentence of the first paragraph on page 170</p> <p><i>The CAA Research Report CAP 1144 evaluated a number of incidents that were very old (1970's through 1990's) with only two events occurring in the past 15 years. A Deployable ELT or a combined Deployable Recorder/ELT designed and certified to <u>modern</u> standards and not using a 'G' Switch as a means for deployment would not experience the same level failure. The current Specifications for Deployable ELTs (ED-62a) and Deployable Recorders (ED-112b)</i></p>	

*define robust and reliable requirements for accident survivability. However, it may be appropriate to undertake an investigation to ascertain if survivability standards should be increased to address antenna failures of AD(ELTs) that employ the use of an externally mounted antenna. ED-112b also addresses the G-switch issue, for which ED-62a may require further update.*

response Noted. The Agency thanks you for this comment.

comment 84

comment by: *Blake van den Heuvel*

Comment on Note 2 on page 170  
*DRS fully concur with Note 2.*

response Noted. The Agency thanks you for this comment.

**6. Appendices – (v) – RIA D: Very long detection range ULD for wreckage localisation in oceanic areas – 6. Conclusion and preferred option**

p. 185-186

comment 8

comment by: *Beechcraft Corporation*

While the Beechcraft Corporation supports the intent of the NPA, we do not feel the benefit to general and business aviation aircraft is significant enough to apply the requirement for a 90 day minimum operating life to this group. This requirement negatively impacts operators of these aircraft in both available payload and equipage costs.

The requirement for the longer 90 day operating life adds an additional 10 pounds (4.5 kg) with the CVR + FDR configuration, which at the moment arm on the King Air airplane becomes significant. When this loss of payload capacity is considered with the cost for retrofit and forward fit of approximately \$35,000 (EUR 25 000) per aircraft, the benefit is much more evident with the large aircraft operators. Beechcraft contends the change in requirements should be aligned to these larger passenger-carrying aircraft conducting over-water operations.

Therefore, Beechcraft concurs with the identification of Option 4 as the preferred option with modification of the guidance to be applicable to aircraft with a maximum certified take-off mass over 5 700 kg and a maximum approved passenger seating configuration of more than 19 passengers.

response Not accepted.

The replacement of 30-days flight recorders ULDs by ULDs with a transmission time of 90 days will have no impact on the aircraft weight, as models of 90-days ULDs have the same size factor and they are interchangeable with 30-days ULDs. The total cost of replacing the flight recorder ULDs for an aircraft equipped with two fixed flight recorders has been assessed to be around € 800 (refer to paragraph 5.4.2.4 of regulatory impact assessment C of NPA 2013-26).

comment 15

comment by: *BEA*

BEA comments: BEA proved during the work of the AF447 "Flight Data Recovery" and "Triggered Transmission of Flight Data" Working Groups that the preferred options detailed in the NPA were the best long-term solutions to ensure that nobody will ever again face the difficulties met by the BEA in finding the AF447 wreckage. BEA is supporting the preferred option of the EASA mandating large

aircraft built since 1<sup>st</sup> January 2005 operated in Commercial Air Transport, not equipped with a reliable means to determine the location of the impact point within 6 nm accuracy, to be equipped by 1 January 2019 with an 8.8 kHz ULB.

response

Noted. The Agency thanks you for this comment.



## 6. Attachments to comments

 [Proposed Changes Regulatory Paragraphs NPA 2013-26.pdf](#)

Attachment #1 to comment [#79](#)

## **Annex: Recommendations of the EFRPG on very long recording duration CVRs**

The EFRPG always produces documents and statements under its own name solely and never on behalf of any Authority. Every EFRPG document disclosed by the group contains the following disclaimer:

*"This document was produced by the European Flight Recorder Partnership Group (EFRPG) which is an independent voluntary group of European flight recorder experts. It is solely presenting the EFRPG views and it is not binding for any other organization."*

The Initial Safety Evaluation titled 'Very long recording duration CVR' was adopted by the EFRPG in February 2013. At that time, the EFRPG members were flight recorder expert from the following organisations:

- Air Accidents Investigation Branch
- Agencia Estatal de Seguridad Aerea
- Airbus
- Alitalia
- Agenzia Nazionale per la Sicurezza del Volo
- Boeing
- Bond Offshore Helicopters
- Bureau d'Enquêtes et d'Analyses
- European Aviation Safety Agency
- European Cockpit Association
- Eurocopter
- FAA
- FedEx
- Lufthansa Technik
- Pilatus Aircraft
- UK Civil Aviation Authority

The EFRPG document is not public, however the conclusions of this document are presented below.

*'Given all these considerations, the conclusions of the initial safety evaluation are the following:*

1. *The European air operation rules should be modified in order to:*
  - a. *complete the regulatory provisions pertaining to the preservation of the CVR recording after an accident or a serious incident, in particular with regards to instructions produced by aircraft operators and continuing airworthiness management organizations for flight crews and maintenance staff.*
  - b. *require that newly manufactured aeroplanes of a MCTOM over 27 000 kg that are required to carry a CVR be equipped with a CVR of recording duration of no less than*

*15 hours and no more than 20 hours. It is advised to give a notice of at least three years from the time of requirement publication, and to apply this new requirement to aircraft first issued with an individual certificate of airworthiness from a date (to be determined) posterior to 01 January 2016. This date should be the same for commercial air transport, general aviation and aerial work.*

- c. require that the aircraft identified in b, when fitted with a data link communication capability, have a data link recording duration equal to or larger than the CVR recording duration.*
  - d. in a second step, require that newly manufactured aeroplanes of a MCTOM over 5 700 kg that are required to carry a CVR be equipped with a CVR of a recording duration of no less than 15 hours and no more than 20 hours. For example, this could enter into force two years after the similar requirement affecting aeroplanes with a MCTOM over 27 000 kg.*
  - e. Require that the aircraft identified in d, when fitted with a data link communication capability, have a data link recording duration equal to or larger than the CVR recording duration.*
- 2. The safety data examined by the EFRPG do not support a requirement to retrofit currently operated aeroplanes with CVRs of a longer duration than two hours.*
  - 3. The safety data examined by the EFRPG do not support a requirement for very long recording duration CVRs onboard helicopters.*
  - 4. The safety investigation authorities of EU Member States should ensure that the advance arrangements with judicial investigation authorities required by Regulation (EU) 996/2010 cover precautions to be taken with the CVR, in order to prevent unnecessary damage to flight crew privacy during and after a judicial investigation.*
  - 5. The EU Member States should define penalties that effectively dissuade parties from illegally disclosing sensitive information, including CVR recordings.*
  - 6. Erasing the CVR recording after an uneventful flight is a legitimate privilege of flight crews. Nothing opposes the application of this privilege during normal operation; however care should be taken to preserve the CVR recording when in doubt.*
  - 7. Further efforts by all stakeholders will be necessary to prevent the misuse of CVR data and related breach of privacy issues, especially after an accident. These efforts should include strict application of the regulatory provisions and prosecution of offenders as well as education of the relevant stakeholders as to the importance of protection of data to the safety system.'*